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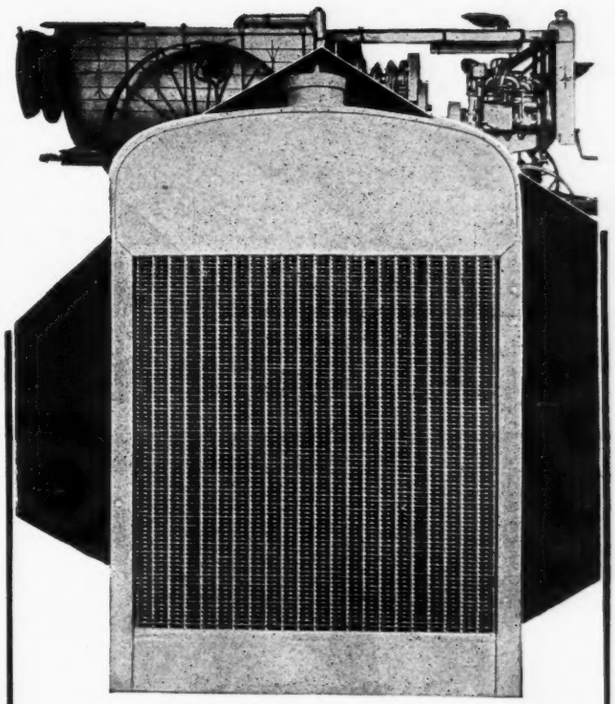

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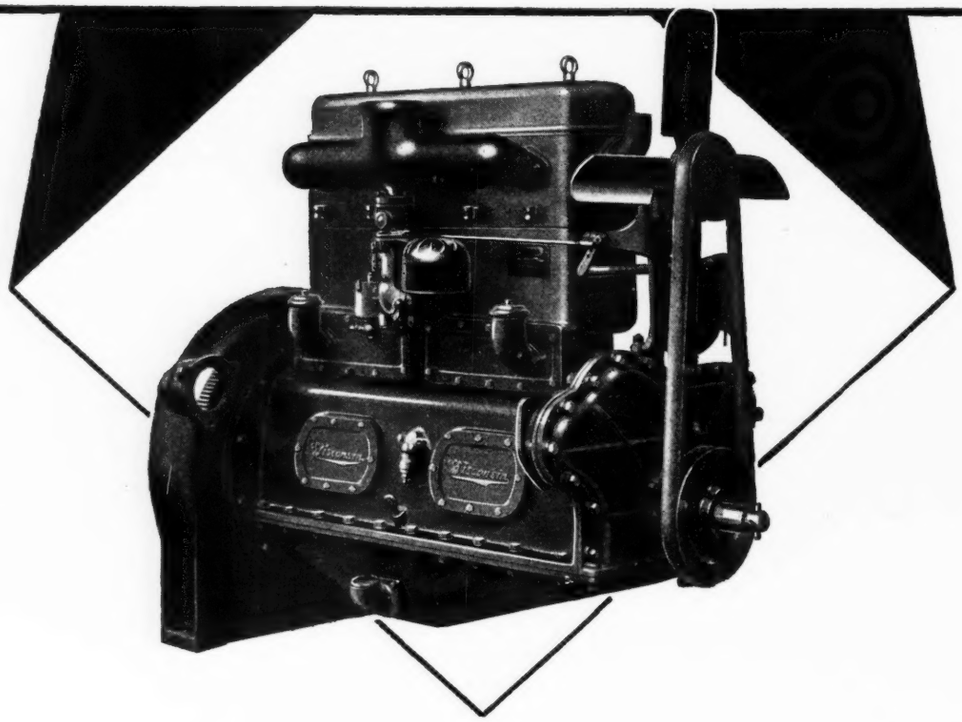

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AUTOMOTIVE INDUSTRIES

VOLUME 59 *Philadelphia, Saturday, September 15, 1928* NUMBER 11

Massachusetts Insurance Law Appears Near Collapse

Controversy over compulsory automobile liability rates is expected to result in move for repeal of statute. One underwriter quits field and commissioner resigns.

AFTER 20 months of troubled operation, the Massachusetts compulsory automobile liability insurance law is facing its most critical period. Under pressure from his own Republican colleagues, the commissioner of insurance has resigned; the rate situation is in chaos and the certainty of a number of lawsuits is faced, while the stage is being set at the forthcoming session of the legislature for a struggle over bills to repeal the law and others to change completely the manner of its functioning.

The uproar in Massachusetts, involving State officials, insurance companies, members of the bar, automobile dealers and owners, as well as the public generally, comes at a particularly important time, since the approaching legislative season for other States has been expected to be widely productive of proposals for compulsory insurance based more or less on the Bay State precedent.

Out of the welter of facts and opinion, which will probably not be clarified and brought into order for months, one conclusion may fairly be drawn—that those who have contended that more experience with, and study of, the plan for compulsory insurance are necessary before its general adoption is feasible have been thoroughly vindicated. Just now in Massachusetts, opinion on the subject is probably more widely divergent than at any time since the proposal first was broached.

The events leading to the present impasses may be set down in roughly chronological order as follows:

Acting in accordance with the law, Wesley E. Monk, the insurance commissioner, prepared a new schedule of rates for 1929, involving major increases in the Boston area, ranging as high as 100 per cent in some classifications. Rates elsewhere were unchanged or reduced somewhat.

An attempt to increase the insurance rates has been blocked by the protests of Governor Fuller and other State officials

This action touched off the explosion. In all the ensuing flare-up of opposition, however, there has been little or no disposition to charge that the commissioner was not performing his duty. He was obligated to insure a fair return on their investment to the insurance companies, and on the basis of the available figures, a rate increase appeared to be in order. It is true that the figures are those of the insurance companies, but no means have been set up for determining independently the accuracy of the report.

Increase is Blocked

Attorney General Warner, Lieut. Governor Allen, Governor Fuller and others protested Commissioner Monk's action, and he resigned without filing the new schedule, which automatically leaves the old rates in effect. Thereupon the insurance companies began to devise legal means for an appeal, and one important underwriter, the New York Indemnity Co., announced its withdrawal from the Massachusetts field with the following telegram to the acting insurance commissioner, Arthur E. Linnell:

"We advise you that because of the inadequacy of rates for compulsory automobile liability insurance in Massachusetts resulting in a net loss to this company estimated at between $100,000 and $200,000 for this year, we have instructed our Massachusetts representatives to forthwith discontinue such business."

Jeffries Harding, the Boston representative, immediately notified Motor Vehicle Registrar

George A. Parker, as the law provides for this. The company has about 150 agents writing automobile liability insurance in Massachusetts. A checkup of the company's finances on file at the State House shows that in 1927 it received $206,000 from this type of insurance and paid out actually $124,900. The outstanding claims are not given.

Assistant Attorney General Roger Clapp said that the insurance companies had the right to stop writing this kind of insurance or to withdraw from any particular field and that there was no law to compel them to write compulsory automobile policies although they engaged in other lines.

The position of the State officials who have opposed an increase in rates has been set forth by Governor Fuller as follows:

"We have been having some controversy with the insurance companies recently, and I want to say that I believe the different insurance companies are overcharging the people of this Commonwealth in exorbitant rates for insurance of one kind or another.

Attacks "Insurance Lobby"

"I tried to get a resolution through the legislature to investigate insurance rates, but the insurance lobby was too strong. They told the boys in the legislature what to do and practically every mother's son of them made a low bow and took off his hat. These insurance companies do not need any one at the State House to look out for them, except to see that they don't carry it off."

When told of the New York Indemnity Company's action to stop writing insurance in Massachusetts, Governor Fuller said: "I think the other companies are still paying a commission of 17 per cent to their agents who turn them in some of this 'unprofitable' compulsory business. I might say that the insurance companies pay a commission in excess of that recommended by the insurance commissioner.

It is perhaps an evidence of the belief of the insurance companies in the soundness of their case that they are planning legal means for appealing the present rates, in which case their figures on premiums and losses would be subject to scrutiny in open court. Under the original law, appeal had to be made shortly after the filing of rates, and as the current rates were filed more than a year ago, appeal would be impossible. An amendment effective June 11 may open the way to an appeal, however, though it probably was not intended to cover a situation of the present character.

Meanwhile, however, another influential group—the truck operators—appears to have suffered through the recent developments. Commissioner Monk had stated that the new schedule would lower rates on commercial vehicles.

Appeal is Considered

Secretary Day Baker, of the Motor Truck Club of Massachusetts, states that attorneys for the organization are now considering an appeal to the Supreme Court on behalf of its members based upon the assertion of ex-Commissioner Monk that under his proposed schedule of new rates the premiums for commercial vehicles were to be lowered. His refusal to file the rates following his resignation left the commercial vehicle rates in the same status as for 1928.

Among the important legislative moves planned are:

1. A bill to be prepared by the insurance companies to repeal the compulsory insurance law.

2. State Treasurer William A. Youngman, candidate for lieutenant governor, has a bill providing that all reports of settlements to be filed with the insurance department at the State House so that they would be open to the public.

3. Frank A. Goodwin, ex-motor vehicle registrar, a candidate for governor, is advocating a State fund to handle the insurance whereby $10 or $15 will be paid by motorists when they register their vehicles, and out of this to be paid the claims, under State supervision, and investigations made by the motor or some other department.

Compulsory insurance evidently has not worked out so smoothly in Massachusetts. Nearly everyone acknowledges that it has proved a gold mine to unscrupulous attorneys and accident fakers. This was predicted as long ago as 1926. Exorbitant claims have been the rule since the law became effective. Inasmuch as every motorist in the Bay State is insured there is no such thing as a judgment-proof motorist, as far as personal injury or death claims are concerned. Naturally, this condition of affairs is just what the ambulance-chaser seeks.

Future compulsory insurance laws will have to take into consideration the fact that this form of protection for the dependents of automobile accident victims and the victims themselves breeds accident faking.

There is reason to believe that the "Massachusetts Muddle," as it has been referred to, may result in State insurance. This factor is not one to please the insurance companies, who have all along opposed compulsory automobile insurance secretly on the ground that it would eventually result in a State fund to be administered in much the same manner as workmen's compensation funds are handled by the various States. Just how the State could be more effective in curbing accident faking and reckless driving than insurance companies have been is problematical. Workmen's claims appear to be less susceptible of fraud. Under State insurance however, the motorist would at least be assured of insurance at cost, provided the State fund is properly handled and politics is kept out of its administration.

A Warning to Other States

The most significant part of the situation in the Bay State is that it demonstrates, or should demonstrate, to legislators throughout the country that compulsory insurance is not yet successful in Massachusetts. It should prove some of the difficulties of such a law. In view of the political campaign under way, furthermore, it seems safe to predict that for a time, at least, legislators will proceed slowly with proposals in other States.

ANNOUNCEMENT has been made by the American-LaFrance & Foamite Corp. of a new 5-ton model designed for heavy duty service. Known as the "Big Chief," this new unit is offered in three wheelbases, 196, 226 and 242 in. It is powered by a 4½ by 6 in. six-cylinder engine developing 114 hp. at 1600 r.p.m.

It has a 14-in. single-plate clutch, four-speed transmission, three bevel gear type differential and steering mechanism with double reduction gears. Springs are of chrome-silico-manganese steel and the frame of heat-treated, chrome-nickel pressed steel. Standard equipment includes electric lights, combination tail and stop-light, electric horn, starter, front bumper, speedometer, disk wheels, spare wheel and carrier.

A RECENT traffic census in London showed the traffic density to have increased 2.43 per cent during the last two years. The increase was entirely in the two classes of light and heavy motorcars, all other classes, from barrows to tramcars, showing declines.

Accessory Manufacturers *Adding* to *Wholesale* Outlets

Trend shown by recent survey is attributed to competition which has developed during last two years.

By Leon F. Banigan
Editor, Motor World Wholesale

A SUBSTANTIAL increase in the number of cities recognized as wholesaling centers and in the actual number of wholesalers being used by accessory manufacturers is shown by the 1928 survey recently made for its accessory manufacturer members by the Motor & Accessory Manufacturers Association. The survey was conducted by Neal G. Adair, manager of the Sales Development Department.

In comparison with a similar survey completed early in February, 1927, and covering a period during the latter months of 1926, the results strikingly show the change that has taken place.

The picture shown is one of effects. It is a picture of the results of the intensive development of markets largely brought about by the diminishing of what might be called the "cream" or surface market for accessory sales. While the equipment of cars at the factories has shown a steady upturn, the production of cars in competitive price classes has actually developed a market that is increasing each year. However, this market is not so readily accessible as the accessory market was in the days when very few cars were factory equipped. In the meantime, the larger car dealers who form the bulk of the jobbers' retail outlets are not contacting so often with their customers as they did in the past. And this combined with the growth in the number of retailers in the past few years has provided a natural setting for recognition of the opportunity for an increased number of wholesale outlets to cultivate and serve the retailers more intensively.

The accessory manufacturer has not gone to more wholesale outlets willingly. The process has meant for him increased selling costs, increased credit costs, and increased accounting, packing and shipping costs. Competition, however, the necessity for obtaining and holding a profitable volume of business, has brought about the change.

The facts are the true measure of the trend and are presented solely for the purpose of acquainting factory sales executives with conditions in accessory distribution today as compared with conditions that existed approximately two years ago.

Before the figures are presented in this article it should be pointed out that this survey contains some elements of uncertainty which might easily become elements of error in any deductions based solely upon these comparisons. First of all, the two surveys compared in this article—one completed February, 1927, and the other September, 1928, are not entirely identical as to contributing companies. The earlier report was based on returns from 36 accessory manufacturers. The latter survey embraces 50. However, 15 companies distributing through

Comparison of Wholesale Outlets, Feb., 1927, and Sept., 1928

Accessory manufacturers selling through automotive equipment jobbers:

Company Number	Number Towns Where Wholesalers Located		Number Jobbers Employed	
	1928	1926	1928	1926
1	183	67	496	487
2	201	159	417	323
3	118	75	228	126
4	428	386	1,582	1,324
5	168	148	290	256
6	241	226	461	473
7	263	215	466	380
8	288	310	737	805
9	173	250	381	548
10	265	221	603	521
11	114	26	177	36
12	208	207	278	273
13	184	155	412	338
14	180	114	348	210
15	321	206	206	431
Average—				
15 companies	222	184	518	435
	21% increase		19% increase	

Companies selling through specialty distributors:

Company Number	Number Towns Where Distributors Located		Number Specialty Distributors Employed	
	1928	1926	1928	1926
1	125	82	143	108
2	142	98	166	105
3	16	41	18	41
4	129	154	129	154
5	67	58	67	58
6	107	119	107	119
7	81	67	81	67
8	86	72	86	72
9	70	51	70	51
10	188	*64	188	*76
Average—				
10 companies	101	80	105	85
	26% increase		23% increase	

* Company No. 10, now employing specialty distributors only, in 1926 also employed 89 jobbers, located in 76 towns.

general automotive wholesalers reported in both surveys as did 10 companies distributing through specialty distributors. The results of these specific comparisons are presented with this article. (For obvious reasons, numbers are substituted for names.)

Comparison of the complete studies for 1926 and 1928 of the Motor & Accessory Manufacturers Association shows that with four exceptions, all accessory manufacturers who distribute through automotive wholesalers have representation in more towns today

Showing Growth of Accessory Wholesaling by States and Zones

STATES	Passenger Car Registrations		Total Retail Trade Units Servicing Cars and Trucks		Total Retail Accessory and Supply Outlets		Number of Cities in Which One or More Manufacturers Have Wholesalers		Number of Cities in Which Three or More Manufacturers Have Wholesalers		Number of Cities in Which Five or More Manufacturers Have Wholesalers	
	1926	1927	1926	1927	1926	1927	1927	1928	1927	1928	1927	1928
Maine	124,158	134,100	899	825	715	543	5	11	5	5	4	5
New Hampshire	78,400	84,000	492	548	337	351	4	7	2	5	1	2
Vermont	68,231	73,190	471	510	432	380	3	6	2	3	1	1
Massachusetts	597,539	612,855	2,352	2,609	1,462	1,644	16	34	10	21	4	14
Rhode Island	89,832	99,854	428	466	168	350	2	4	1	3	1	2
Connecticut	219,959	238,643	1,051	1,066	847	739	12	19	7	12	7	10
Total—Zone 1	1,178,119	1,242,642	5,693	6,024	3,961	4,007	42	81	27	49	18	34
Per Cent Increase	5.48%		5.81%		1.16%		93%		82%		89%	
New York	1,460,927	1,579,051	6,655	7,305	5,409	5,144	38	76	33	41	23	36
Pennsylvania	1,259,719	1,345,526	6,207	6,526	5,392	5,552	35	75	23	34	19	26
New Jersey	520,489	576,133	2,505	2,843	1,537	2,411	15	32	8	17	6	13
Total—Zone 2	3,241,135	3,500,712	15,367	16,674	12,338	13,107	88	183	64	92	48	75
Per Cent Increase	8.01%		8.51%		6.23%		107%		44%		56%	
Delaware	36,246	38,037	166	174	120	111	1	3	1	3	1	1
Maryland	236,680	271,861	882	897	665	743	9	9	3	5	3	4
Dist. of Columbia	115,633	111,145	188	167	145	143	1	1	1	1	1	1
Virginia	271,517	286,334	1,110	1,228	894	1,041	14	19	7	11	6	9
North Carolina	352,217	383,456	1,280	1,380	972	1,275	16	23	10	18	7	15
South Carolina	163,368	179,568	564	580	394	389	7	12	5	8	5	6
Florida	346,492	329,200	1,133	929	693	734	13	19	6	12	4	10
Georgia	238,350	258,461	994	958	883	727	11	16	7	8	7	7
West Virginia	194,620	209,326	946	1,043	864	940	16	22	7	9	6	8
Total—Zone 3	1,955,123	2,067,388	7,263	7,356	5,630	6,103	88	124	48	75	40	61
Per Cent Increase	5.74%		1.28%		8.40%		41%		56%		53%	
Ohio	1,325,000	1,372,621	5,459	5,730	2,984	4,077	26	59	20	33	15	27
Indiana	664,230	696,457	3,302	3,163	3,281	3,057	21	32	12	21	4	17
Illinois	1,195,014	1,254,421	5,242	5,604	4,146	4,486	27	42	18	25	13	21
Michigan	969,686	999,915	3,275	3,575	2,891	3,468	16	32	12	12	12	14
Wisconsin	581,467	609,950	2,893	3,201	2,468	2,778	16	25	10	17	7	12
Total—Zone 4	4,735,397	4,933,364	20,171	21,273	15,770	17,866	106	190	72	108	51	91
Per Cent Increase	4.18%		5.46%		13.29%		79%		50%		78%	
Minnesota	552,944	558,437	2,603	2,778	2,080	2,657	8	14	6	8	6	6
Missouri	586,134	607,145	2,661	2,980	1,987	2,470	8	18	7	9	5	7
Iowa	639,457	642,632	3,217	3,359	2,440	1,795	21	27	16	17	12	15
North Dakota	145,571	144,827	800	880	711	877	5	6	4	4	4	4
South Dakota	153,840	154,059	888	922	742	803	7	7	5	5	4	5
Nebraska	338,923	342,357	1,679	1,745	1,346	1,465	8	13	5	5	4	5
Kansas	441,373	447,272	2,333	2,041	2,031	2,139	11	21	5	11	5	7
Total—Zone 5	2,858,242	2,896,730	14,181	14,705	11,337	12,206	68	106	48	59	40	49
Per Cent Increase	1.34%		3.70%		7.67%		56%		23%		22%	
Kentucky	249,412	255,370	1,060	1,162	788	847	9	17	4	7	4	5
Tennessee	254,342	269,984	808	1,040	596	962	8	10	5	7	5	7
Alabama	197,641	211,633	651	782	645	714	6	14	5	9	4	9
Mississippi	189,000	204,403	583	662	549	633	6	12	2	5	2	3
Total—Zone 6	890,395	941,390	3,102	3,646	2,578	3,156	29	53	16	28	15	24
Per Cent Increase	5.73%		17.51%		22.42%		83%		75%		60%	
Arkansas	179,480	174,524	695	795	570	668	7	10	3	4	3	3
Louisiana	204,000	216,000	638	635	535	526	8	9	5	6	4	4
Oklahoma	460,000	588,000	1,575	1,669	1,304	1,539	15	22	8	15	6	9
Texas	938,732	993,288	4,137	4,325	3,283	3,141	29	46	17	24	15	19
Total—Zone 7	1,783,212	1,971,812	7,045	7,424	5,692	5,874	59	87	33	49	28	35
Per Cent Increase	10.58%		5.38%		3.20%		48%		49%		25%	
Montana	88,828	94,752	540	557	473	483	6	8	5	5	5	5
Idaho	86,779	92,500	396	461	341	441	5	9	3	5	2	4
Wyoming	44,108	45,806	306	320	277	310	2	5	1	1	1	1
Colorado	232,350	245,738	1,069	1,124	935	1,078	5	10	3	4	2	2
New Mexico	52,111	56,000	309	329	270	300	3	4	1	2		2
Arizona	63,500	64,118	340	329	308	333	4	3	3	3	2	3
Utah	69,133	67,731	390	445	341	425	4	4	2	3	2	2
Nevada	19,300	20,414	149	142	127	119	1	1	1	1	1	1
Total—Zone 8	655,109	687,059	3,499	3,707	3,072	3,489	30	44	19	24	15	20
Per Cent Increase	4.88%		6.00%		13.51%		47%		26%		33%	
Washington	311,092	330,877	1,539	1,886	1,308	1,655	8	12	5	7	5	6
Oregon	215,832	224,715	985	1,118	810	991	3	6	1	3	1	2
California	1,384,152	1,485,527	4,913	5,242	4,088	4,444	19	27	8	12	7	8
Total—Zone 9	1,911,076	2,041,119	7,437	8,246	6,206	7,090	30	45	14	22	13	16
Per Cent Increase	6.80%		10.87%		14.24%		50%		57%		23%	
United States	19,207,808	20,282,214	83,758	89,055	66,584	72,898	510	913	341	496	268	405
Per Cent Increase	5.59%		6.32%		9.48%		79%		46%		51%	

Note.—Information relative to number of Wholesalers from M.A.M.A. surveys of service parts manufacturers Feb., 1927, and Sept., 1928. Registrations from Automotive Industries; Retail Service and Supply Outlets, Direct Mail Division, Chilton Class Journal Co.

than they had two years ago, and all except six manufacturers are selling through more wholesale outlets. Several manufacturers increased their representation 100 per cent or more.

In the 1926 survey, there were 582 towns in which 26 accessory manufacturers of the M. & A. M. A. had wholesale representation; in the present analysis, 912 towns are listed. In the 1927 survey, five or more manufacturers had wholesale representation in 276 towns and specialty distributor representation in 64 towns, while in the 1928 survey five or more manufacturers are represented in a total of 405 towns and have specialty distributors in 79 towns.

Products Handled

The products handled by the manufacturers selling through general automotive wholesalers include air cleaners; accelerators for Fords; anti-flare shields; ash receptacles; auxiliary manifolds; baggage racks; bumpers; brakes for Fords; license brackets; battery fillers; air brushes; tool and battery boxes; tire and tire locking chains; clocks; priming cups; spare tire carriers; cigar lighters; dash controls; polishing cloths; curtains; tire and seat covers; chemicals; dimmers; pedal depressors; tire chain emergency units; engine valve testers; friction type equalizers; fire extinguishers; oil filters; license plate fasteners; gas and oil gages; grease guns; steam and exhaust heaters; hand, electric and air horns; acid hydrometers; heat and motor temperature indicators; jacks; cowl, road, electric head, gas head, side, spot, stop, tail, parking, camp, dash, and trouble lamps and reflectors; spare tire locks; mirrors; pedal pads; patches; plasters; radiator shutters; radiator caps; spark plugs; speedometers; shock absorbers; step plates; steering wheels; spring cushions; display stands; stopmeters; tire and radiator solution testers; traffic signals; portable tire repair apparatus; timers; vacuum cleaners; valve insides; valve cups; window anti-rattlers; socket wrench sets; windshields and wings; windows; automatic and hand-operated windshield cleaners.

The products handled by manufacturers selling through specialty distributors include bumpers; electric horns; jacks; wheels and tire locks; lubricating devices; oil purifying systems; radiator shutters; spring covers; shock absorbers; windshield cleaners.

Wholesale Points Recognized

Total number of towns in the United States in which one or more companies are represented by either jobbers or specialty distributors or both	913
Number of towns in which one or more companies are representated by automotive equipment jobbers	898
Number of towns in which five or more companies are represented by automotive equipment jobbers	405
Greatest number of jobbers employed by any one company	1582
Smallest number of jobbers employed by any one company	53
Average number of jobbers employed per company	501
Number of towns in which one or more manufacturers are represented by specialty distributors	327
Number of towns in which five or more manufacturers are represented by specialty distributors	70
Greatest number if specialty distributors employed by any one company	188
Smallest number of specialty distributors employed by any one company	18
Average number of specialty distributors employed per company	105

Summarized Analysis of Wholesale Representation

	Automotive Equipment Jobbers	Specialty Distributors
Manufacturers selling less than 100	1	5
Manufacturers selling 100 to 200	4	5
Manufacturers selling 200 to 300	9	
Manufacturers selling 300 to 400	5	
Manufacturers selling 400 to 500	6	
Manufacturers selling 500 to 600	2	
Manufacturers selling 600 to 700	3	
Manufacturers selling 700 to 800	3	
Manufacturers selling 800 to 900	1	
Manufacturers selling 900 to 1000	3	
Manufacturers selling more than 1000	3	

New Volume on Ignition

PROBABLY no other branch of automobile engineering has been so extensively dealt with in technical book literature as that of the electrical equipment. This is partly accounted for by the fact that during the 30 years or so of automobile history there have been many changes in ignition practice, and, besides, the introduction of electric lighting and engine starting about 1911 gave the automobile a complete electric powerplant which eventually led to the use of a good deal of auxiliary electrical apparatus. Not only did the automobile designer have to keep abreast of new developments in this field, but a vast army of service men had to be trained to keep magnetos, storage batteries, generators, starters and auxiliary apparatus functioning properly. Hence there was, apparently, great need for information of a practical character.

The Berlin publishing house of M. Krayn has decided to add to its series of technical volumes on automobile subjects known as the Automobiltechnische Bibliothek, three volumes dealing with different phases of automobile electrical equipment, and the first volume, devoted to ignition, has recently been issued. The title of the volume is Zuendung (Ignition) and the authors are Erich Klaiber and Dr. Walter Lippart. The book is intended to be of help to engineers engaged in the design of internal combustion engines, to familiarize with the subject those having to do with the maintenance and repaair of electrical equipment and to serve as a guide to those engaged in developmental work in the electrical equipment field. While it is thus addressed to a rather wide circle of readers, it may be said that the appeal is mainly technical.

In selecting the material it has been the rule to confine the discussion mainly to types of apparatus in use in Germany and to refer to foreign products only where they differ in principle from any produced in Germany. This probably explains why the book is devoted almost entirely to magnetos and very little is said about battery ignition.

NEW rates of duty on tractors have gone into force in France recently. Hereafter the duty on tractors weighing less than 2750 lb. will be 250 francs per 220 lb.; on tractors weighing between 2750 and 4400 lb., 250 francs per 220 lb.; on tractors weighing between 4400 and 6600 lb., 175 francs per 220 lb. and on tractors weighing more than 6600 lb., 85 francs per 220 lb.

How Motion of a Mechanism

Part 1—Applying the Method to a Crank Train

By William Samuels

THE success of engineering work, particularly in the automotive field, depends to a great extent upon a full understanding of the motions produced by the various mechanisms employed. These motions can be analyzed algebraically with the aid of differential calculus. However, even relatively simple mechanisms, as for instance, the crank drive, produce motions of considerable complexity. The algebraic expressions then have to be simplified, at the expense of completeness. Aside from this difficulty, the engineer, and particularly the designer, mostly has more of a mind for geometry than for algebra.

In this paper, I wish to show how the motion of a mechanism can be analyzed completely from its geometry. In offering this discussion I wish to express my appreciation of the aid and encouragement in this work which I have received from my friends of the Chevrolet engineering department. The method described here was indicated a few years ago by Prof. Rudolf Doerfel in the journal of the Society of German Engineers*.

While the application of this method does not call for a knowledge of differential calculus, a full understanding of the principles does require a slight familiarity with that branch of mathematics. In order to make the method accessible to every engineer the following explanation is offered:

Distances, Angles, Times and Speeds

We are dealing in this paper primarily with distances, angles, times and speeds. Let a and b denote the momentary values of any two or these four factors. While the motion progresses a small amount, a will have a small increase Δa and b a small increase Δb, Δa and Δb being either positive or negative. If the progress is infinitesimal, Δa and Δb become infinitesimal too and we denote them by da and db. Just as Δa and Δb had a certain proportion to each other, da and db, have a well defined finite proportion to each other. This proportion is the derivative da/db also denoted by a'. It will be shown in this paper how these derivatives may be found geometrically.

In any mechanism we may distinguish between a driving end and a driven end. The motion of one end must be known in order that the motion of the other may be found. For convenience we will call the end whose motion is known the driving end. In a crank drive for instance, the crank, which is generally assumed to rotate at uniform speed, is the driving end, and the crosshead or piston the driven end.

First Type.

As a starting point for our considerations let us use the spinning-wheel drive—a rotating crank (the driving end) coupled by a rod to a swinging lever (the driven end). If we move the crank through a small angle Δa_1, the lever moves through a small angle Δa_2. The magnitude of Δa_2 depends upon the "reduction" of the mechanism at the particular place under observation, which changes from point to point. The exact meaning of the term "reduction," as used here, will be grasped immediately if we state the simple relation $\Delta a_2 = \Delta a_1 \times u$, where u denotes the reduction at the particular place. Hence we have $u = \Delta a_2 / \Delta a_1$ or approaching the limit

$$u = da_2/da_1 \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

This reduction u, as will be shown later, can be found geometrically, for any momentary position of any mechanism, generally in a very simple manner. This conception of a reduction $u=da_2/da_1$, in our considerations replaces to a great extent the more fundamental conception of speed—in this case rotary speed— $\omega_2 = d\,a_2/dt$, where t designates the time and ω_2 the driven rotary speed. This substitution of reduction for speed is necessary to permit of a geometrical solution; for the time is not represented in the geometrical picture of the mechanism.

We can transform

$$u = \frac{da_2}{da_1} = \frac{da_2/dt}{da_1/dt} = \frac{\omega_2}{\omega_1}$$

where ω_2 and ω_1 designate the driven and the driving rotary speed respectively. We then have

$$\omega_2 = \omega_1 \times u \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

where the reduction u is a proportion. From equation (2) we find the rotary acceleration ω_2' by differentiating with respect to time t:

$$\omega_2' = \frac{d\omega_2}{dt} = \frac{d\,(\omega_1\, u)}{dt} = u\,\frac{d\omega_1}{dt} + \omega_1\,\frac{du}{dt}$$

considering that $dt = da_1/\omega_1$,

$$\omega_2' = u\,\frac{d\omega_1}{dt} + \omega_1^2\,\frac{du}{da_1}$$

In this equation $d\omega_1/dt$ is the known driving acceleration, which we will designate by ω_1'. The factor du/da_1 is an expression of similar significance as the reduction $u=dc_2/da_1$, being the second derivative of da_2 with respect to da_1. We will designate this factor du/da_1 by u' and call it the accelerating reduction, as distinguished from u, which hereafter will be called the speed reduc-

* "Die Betriebe Und Die Zeit," Zeitschrift d. Ver. Deutscher Ing. May, 1923. P. 402.

May be Analyzed *Geometrically*

tion. With these designations we have:

$$u' = \frac{du}{d\alpha_1} \quad \ldots\ldots\ldots\ldots\ldots (3)$$

The same as u, u_1 can also be determined geometrically for any momentary position of any mechanism. Substituting in our equation for ω_2', we find the rotary acceleration:

$$\omega_2' = \omega_1' u + \omega_1^2 u' \quad \ldots\ldots\ldots\ldots\ldots (4)$$

u' being a proportion the same as u. If now, as is frequently the case, the driving speed ω_1 is constant or can be considered so, the driving acceleration ω_1' is zero. In that case:

$$\omega_2' = \omega_1^2 u' \quad \ldots\ldots\ldots\ldots\ldots (IV).$$

It is, however, a distinct advantage of this method that it enables us, by the help of equation (4), to calculate the accelerations of a system also when the driving speed is not uniform.

The above four fundamental equations were derived from a mechanism that converted a driving rotary motion into a driven rotary motion. For mechanisms of a different type these equations must be modified but the modified equations are self-explanatory for the most part.

Second Type

Linear driving speed v_1. Linear driven speed v_2. Driving travel s_1. Driven travel s_2. Driving acceleration v_1^1.

Speed reduction $u = ds_2/ds_1 \ldots\ldots\ldots\ldots (1^b)$
Driven speed $v_2 = v_1 \times u \ldots\ldots\ldots\ldots (2^b)$
Accelerating reduction $u' = du/ds_1 \ldots\ldots\ldots (3^b)$
Driven acceleration $v_2' = v_1' + v_1^2 u' \ldots\ldots\ldots (4^b)$
For uniform driving speed $v_2' = v_1^2 u' \ldots\ldots (IV^b)$

u and u' in this group again are proportions.

Third Type

Rotary driving speed ω_1. Linear driven speed v_2. Driving travel angle α_1. Driven travel s_2. Driving acceleration ω_1'.

Speed reduction $u = ds_2/d\alpha_1 \ldots\ldots\ldots\ldots (1^c)$
Driven speed $v_2 = \omega_1 \times u \ldots\ldots\ldots\ldots (2^c)$
Accelerating reduction $u' = du/d\alpha_1 \ldots\ldots\ldots (3^c)$
Driven acceleration $v_2' = \omega_1' u + \omega_1^2 u' \ldots\ldots (4^c)$
For uniform driving speed $v_2' = \omega_1^2 u' \ldots\ldots (IV^c)$

If we write equation (1^c) in the form $u \times d\alpha_1 = ds_2$, we see that u is a factor which, multiplied by an angle, produces a distance. This shows that u in this group has the significance of a lever arm. If u is a distance equation (3^c) shows that u' in this group also signifies a lever arm.

Fourth Type

Linear driving speed v_1. Rotary driven speed ω_2. Driving travel s_1. Driven travel angle α_2. Driving acceleration v_1'.

For this type the previous analogy does not hold true. The mechanism, as in type 3, connects a linear motion with a rotary motion. Hence the speed reduction u represents a lever arm. But in this case the driven travel angle, multiplied by the lever arm u, must give the driving travel or $d\alpha_2 \times u = ds_1$. Hence:

Speed reduction $u = ds_1/d\alpha_2 \ldots\ldots\ldots\ldots (1^d)$
Driven speed $\omega_2 = v_1/u \ldots\ldots\ldots\ldots (2^d)$

From equation (2^d) we obtain the driven acceleration ω_2^1 by differentiating with respect to time:

THE motions of mechanisms generally are studied by means of the differential calculus, with which many of the men doing design work are not familiar. Moreover, even in the cases of the simplest forms of mechanism it is difficult, if not impossible, to obtain simple and exact expressions for the motion, velocity and acceleration of the driven part if the motion of the driving part is known, and approximations must then be made which affect the accuracy of the result.

Mr. Samuels in a series of articles beginning in this issue describes and illustrates a method of obtaining the desired results geometrically. This method should appeal to designers, as they are generally much more familiar with geometrical than with algebraical methods. In the first part of the article, published herewith, the method is shown applied to the mechanism of a crank train, while in the second part its application to a cam-type valve motion will be shown. The method may lend itself to the solution of the problem of inertia forces in radial engines with articulated connecting rods, which problem so far has baffled solution by the algebraic method, it seems.

$$\omega_2' = \frac{d\omega_2}{dt} = \frac{u\,\frac{dv}{dt} - v_1\,\frac{du}{dt}}{u^2}$$

Considering that $dt = ds_1/v_1$, we find:

$$\omega_2' = \frac{u\,\frac{dv_1}{dt} - v_1^2\,\frac{du}{ds_1}}{u^2}$$

In the derivative du/ds_1 of this equation we recognize the accelerating reduction.

Accelerating reduction $u' = du/ds_1 \ldots\ldots (3^d)$

Substituting this and transforming, we find:

$$\text{Driven acceleration } \omega_2' = v_1' \times \frac{1}{u} - \left(\frac{v_1}{u}\right)^2 u' \ldots (4^d)$$

$$\text{For uniform driving speed } \omega_2' = \left(\frac{v_1}{u}\right)^2 u' \quad (IV^d)$$

While, as stated, the speed reduction u in this group represents a lever arm, we see from equation (3^d) that the accelerating reduction u' in this group signifies a proportion.

If we want to investigate the momentary values of u and u' for a given position of a given mechanism, we draw a diagrammatic picture of that mechanism in that position, and in the same diagram we show the mechan-

ism advanced a small amount beyond the first position. If then we connect corresponding outstanding points of the two neighboring positions and dissolve the motions of such outstanding points during the small advancement into their components, depending upon the nature of the mechanism, certain geometrical miniature figures will appear in the diagram. These miniature figures—triangles, quadrangles, triangles with one side extended, etc.—reveal the relation existing between small but measurable increments of angles and spaces. While the proportions of those infinitesimal figures are not exactly identical with the proportions in which we are really interested, they come close enough.

Having gained an insight into the proportions of those infinitesimal figures for which the miniature figures stand, we are enabled to construct within our geometrical diagram of the mechanism large figures which are approximately similar to the miniature figures and exactly similar to the infinitesimal figures. As will be seen, these large geometrical figures contain the desired momentary values of u and u'.

The foregoing describes the investigation of a mechanism of a certain type by our method. Once this investigation has been carried through, we are able to construct the large geometrical figures, containing u and u', for the same type of mechanism directly, without the help of miniature figures.

In conformity with mathematical usage, the small but measurable increments, forming the miniature figures in our diagrams, have such designations as Δs, $r\Delta a$. To avoid unnecessary delay, these designations are carried through to the infinitesimal stage, when, according to convention, they should be replaced by ds, rda, etc. The differential character of these increments in obtaining the results, however, has been carefully, if tacitly, considered. Consequently an expression like $\Delta u/\Delta a_1$ in our diagrams can be substituted directly for the corresponding expression du/da_1 in our fundamental equations.

Two examples of practical interest may illustrate our method.

The Offset Crank Drive

Fig. 1 represents diagrammatically a vertical, offset crank drive, O being the center of the crankshaft; A, the center of the crankpin, and B, the center of the crosshead or piston pin. The line of travel for B is KQ, OQ being the amount of offset. The crank radius OA equals r_1. The connecting rod length equals r_3. OA has traveled an angular distance a_1 from the vertical and BA an angular distance a_3. The linear travel of B from the upper dead center K, BK, equals s_2. We now slightly advance the mechanism in a clockwise direction. A moves to A', B to B'. The original position is drawn in full lines, the advanced position in dotted lines. OA' equals r_1. $A'B'$ equals r_3. The angle increment for a_1, AOA', *equals* Δa_1, while the increase for a_3 equals Δa_3. The increment for the linear travel s_2, BB', equals Δs_2.

This mechanism is of Type 3 in our classification,

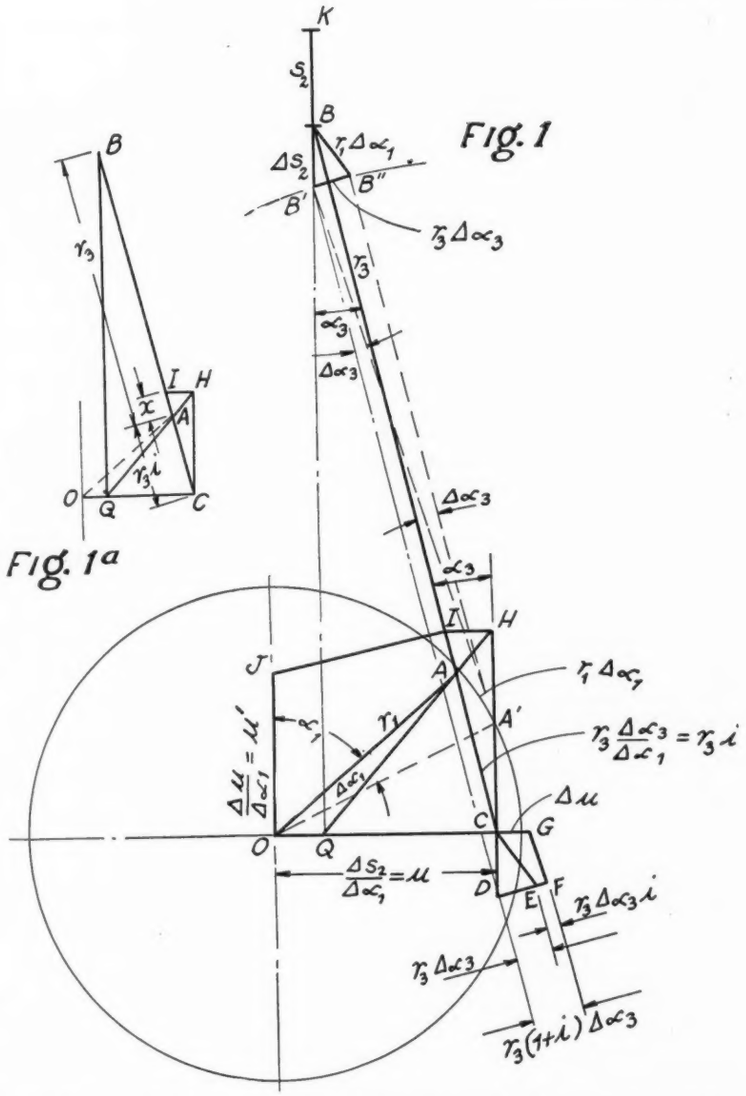


Fig. 1

Fig. 1a

converting the uniform rotary driving speed ω_1 into a linear driven speed v_2. According to equation (1_c), the speed reduction u in that case equals ds_2/da_1 or, in terms of the diagram, $\Delta s_2/\Delta a_1$. Our next object therefore is to establish the relation between Δs_2 and Δc.

From Fig. 1 we see that AA' equals $r_1\ \Delta a_1$ (the angles in our deductions being given in radians). We assume now that the piston pin at B has been removed, permitting us to move to connecting rod AB, during the travel of the crankpin from A to A', parallel to itself into the position $A'B''$. Thus, while A has moved to A', B has moved to B''. BB'' equals A' and therefore $r_1\Delta\ a_1$. We now swing the connecting rod $A'\ B''$ back into the position $A'B'$, whereby the upper end moves from B'' to B'. As seen from Fig. 1, the angle of swing $B''A'B'$ equals Δc_3. Hence $B'B''$ equals $r_3\ \Delta c_3$. In the miniature triangle $BB''B'$, produced by the successive parallel and angular motions of the connecting rod, we now know the three sides to be equal to Δs_2, $r_1\Delta a_1$ and $r_3\ \Delta c_3$ respectively. In other words, $r_1\ \Delta a_1$ and $r_3\Delta c_3$ are the components of the resultant movement Δs_2.

To make use of the relation, we wish to enlarge the miniature triangle $BB''B'$ to a scale that permits measuring. Let us multiply each side by the expression $1/\ \Delta a_1$. That gives us a triangle having sides equal to $\Delta s_2/\Delta a_1$, r_1 and $r_3\ (\Delta c_3/\Delta c_1)$ respectively.

This triangle can now be constructed in our diagram by drawing a line horizontally through O and extending

BA to an intersection C with that horizontal line. Then triangle OAC is the larger triangle, representing miniature triangle $BB''B'$ in the scale of $1/\Delta a_3$, for OA is perpendicular to A, A', hence perpendicular to BB''. The horizontal line OC is perpendicular to the vertical line BB' and AC is perpendicular to $B'B''$. That means that triangle OAC is similar to triangle $BB''B'$ but makes an angle of 90 deg. with the latter. OA and BB'' are corresponding sides of the two triangles and OA equals r_1. On the other hand BB'' equal $r_1\ \Delta a_1$ which, multiplied by the scale $1/\Delta a_1$, gives a length r_1. Hence OAC is the triangle sought.

In this triangle side OC, corresponding to $BB'=\Delta s_2$, has the value $\Delta s_2/\Delta a_1$ and this is the speed reduction u looked for.

In this mechanism u signifies a length, a lever arm which, multiplied by the rotary speed ω_1 of the crankshaft, gives us the piston speed v_2. An engine running at N revolutions per minute has a rotary speed $\omega=2\pi N/60$ radians per sec. For $N=2000$ we have $\omega_1=209.4$. If our diagram were drawn full size and OC, representing u, measured 1.9 in. we would have $u=1.9/12=.158$ ft. Then, for 2000 r.p.m.: Piston speed $v_2=u\times\omega_1=0.158\times 209.4=33$ ft./sec.$=1980$ ft./min.

The expression represented by the side AC of the triangle, $r_3\ (\Delta a_3/\Delta a_1)$, is also of engineering interest. The ratio $\Delta a_3/\Delta a_1$ is the intermediate speed reduction between the rotary driving speed ω_1 and the rotary connecting rod speed ω_3. Expressions corresponding to this intermediate reduction appear in all mechanisms having more than one member. For that reason we will call it "coupling reduction" and denote it by i. In our case, i is a proportion. That is also the reason why it appears in the diagram in the form of $r_3\ (\Delta a_3/\Delta a_1)=r_3 i$. A proportion alone could not be represented by a length. We then have $\omega_3=\omega_1\times i$, where ω_3 is the rotary speed of the piston pin bearing. If the piston pin has a radius r_4, the rubbing speed v_4 in that bearing is $v_4=r_4\ a_3=r_4\ \omega_1 i$. What interests *us* most is the maximum piston pin bearing speed, given by the maximum value of i. This maximum value i max., is reached in the upper and lower dead center positions, when r_1 and r_3 fall into one straight line. In these positions AC coincides with AO. Hence $r_3\ i$ max. $=r_1$. Or i max. $=r_1/r_3$. From this we find the maximum rubbing speed

$$v_{4\ \text{max.}} = r_4\,\omega_1\,i_{\text{max.}} = \omega_1\frac{r_4 r_1}{r_3}$$

The mean rubbing speed of the piston pin bearing may be taken as approximately equal to

$$\tfrac{1}{2}\,v_{4\ \text{max.}} = \omega_1\frac{r_4\,r_1}{2r_3}$$

We will now determine the accelerating reduction of the crank drive which, according to equation (3^c) has the form $u'=du/da_1$ or, in the terms of the diagram, $u'=\Delta u/\Delta a_1$. As already shown, u is represented by the length OC cut off by the extension of BA on the horizontal through O. Consequently, if the connecting rod in its slightly advanced position $B'A'$, extended beyond A', intersects the horizontal through O at G, then CG represents the increase of u, Δu.

In order to establish the relation between Δu and Δa_1 we consider C a point rigidly connected with rod BA, as if BA had a material extension of which C is a point, and trace the travel of this point when the connecting rod advances from BA to $B'A'$. We now loosen the connection at A and move the extended connecting rod BC parallel to itself until point B reaches point B' and point C reaches point D, CD equaling BB', equaling $\Delta\ s_2$. Then, by swinging B'D around B' through an angle Δa_3 we bring the connecting rod back into its advanced position, locking the connection again at A'. During this swing, point D has traveled from D to F. The length of the extended connecting rod BC or $B'D$ equals $r_3+r_3 i$ or $r_3(1+i)$. Consequently, DF equals $r_3\ (1+i)\ \Delta a_3$ and line FB' passes through point G, referred to previously, whose distance from C equals Δu. By the successive parallel and swinging motions of BC we form the miniature quadrangle $CDFG$. Let us now add to the quadrangle side CD, equaling $\Delta\ s_2$, the two components of $\Delta\ s_2$ being found in the miniature triangle $BB'B''$. This is done by drawing a parallel to BB'' through C, the parallel intersecting DF at E. Triangle CDE being congruent with triangle $BB'B''$, DE equals $r_3\Delta a_3$. Side DF equaling $r_3\ (1+i)\Delta a_3$, the difference of DF and DE, EF must equal $r_3\ \Delta a_3\ i$. Consequently, we have the proportion

$$\frac{FE}{DE}=\frac{r_3\,\Delta a_3 i}{r_3\,\Delta a_3}=\frac{i}{1}$$

Our next step will be to find a large quadrangle representing the miniature quadrangle $CDEF$ enlarged in the proportion $1/\Delta a_1$. Since triangle OCA already represents the portion CDE of the miniature quadrangle on that scale, we can build on to this triangle OCA. A point I on line CA beyond A will have to be found, corresponding to point F. From the proportion $FE/DE=i/1$ we conclude that I must be so located that $IA/CA=i/1$. This proportion, however, is already represented on line BC by the three points C, A and B in the relation $CA/BA=i/1$. Consequently, we have $IA/CA=CA/BA$. That means that IA forms a geometric series with CA and BA, CA the intermediate term.

The simplest way of locating I so as to satisfy the above requirement is as follows: We draw a line through A and Q, Q being the intersection of the piston center line KB' with the horizontal OC. A vertical at C intersects the extension of QA at H and a horizontal through H intersects AB at I. That this construction locates point I correctly may best be seen from Fig. 1a. The two triangles QCB and HIC are similar, and the traverses QA and HA drawn in these triangles are similar parts. Consequently, the portions of the hypotenuse cut off by one traverse in one triangle are similar to the portions of the hypotenuse cut off by the other traverse in the other triangle—($IA/CA=CA/BA$).

Having located point I of the large quadrangle, it is easy to complete the latter. In the miniature quadrangle, DFG and DCG are right angles. Hence a perpendicular to IC at I and a vertical to OC at O will intersect each other at J, and $JOCI$ is the large quadrangle sought. Side JO, corresponding to GC, represents the accelerating reduction u'.

The operations for finding u and u' may be briefly summed up as follows: Draw the crank diagram for the position under consideration, which is marked by the points O, A, B. Draw verticals through O and B and a horizontal through O. Mark the intersection Q of the horizontal and vertical lines, the intersection C of the horizontal and BA. Draw QA. From C extend a line vertically up until it intersects with QA at H. From H draw a horizontal line until it intersects with AB at I. From I draw a line at right angles to AB to the intersection J with the vertical through O. $OC=u$. $OJ=u'$.

According to equation (IV^c), the piston acceleration v_2' equals $\omega_1^2\,u'$. In our case u', like u, is a length.

Suppose that in a full size diagram, u' measured 1.4 in.$=0.117$ ft. and that we want the piston acceleration for 2000 r.p.m. For that speed ω_1 was found to be 209.4 radians per sec. Then $\omega_1^2=44000$. Consequently, piston acceleration $v_2' = 44000\times 0.117 = 5{,}150$ ft./sec.^{2}.

Many Advantages Realized *in* Body *of* 5-Piece *All-Steel* Design

Aside from carrying stresses, which was main objective, it has reduced weight, lowered center of gravity, made for less vibration and simplified production.

By E. E. Thum

IN *Automotive Industries* of March 10, 1928, a brief description of a new type of all-steel automobile body developed by the Edward G. Budd Mfg. Co., Philadelphia, was presented. Since that time more information has been made available regarding the economies of this type of body construction and the difficulties which had to be overcome before it could be placed in satisfactory production.

As in many other modern developments, an important feature of the all-steel body has been its trend toward simplicity. All-steel bodies, even in their early developments, contained far fewer parts than the composite body. In fact, by virtue of the ability to weld together various sheet metal stampings into larger assemblies, the all-steel body could be looked upon as an assemblage of a dozen sub-assemblies, so arranged that the joints blended into the striping and beading decorating the exterior.

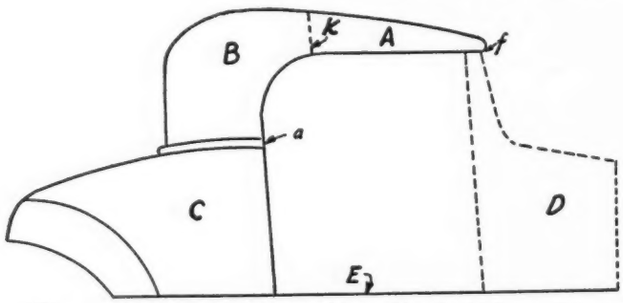


Fig. 1—Older method of making side sheet from several small stampings

It was apparent, however, that the full value of steel as a structural member was not being utilized in these designs. The older steel bodies were in effect self-supporting inclosures bolted to the chassis frame, which latter was designed to carry the stresses, warping and weaving of the moving car. The logical development is suggested by the question: Why not throw some of this work upon the steel of the body, instead of carrying it along as so much dead weight?

Analysis of this problem indicated that such a design would require a one-piece side, considerably stiffer against buckling than the older design, and bolted securely to the side of the chassis frame so as to transmit the necessary forces. It also required that the rear body, the cowl, even the instrument board, be fixed into the structure and act as cross bracing against sidewise forces, and make both sides of the structure carry stresses originating from any pair of wheels.

When this idea was carried to its ultimate conclusion and all parts of the body designed to carry a proportionate share of stress, it was found that the weight of body plus chassis frame was reduced, that the center of gravity was lowered, vibration was lessened, and the "balance" of the moving car improved.

A Stress-Carrying Design

Such material and intangible advantages are the direct result of a determination to use the steel in a car body as a stress-carrying material, in addition to its original functions of keeping the weather out, and a foundation for a pleasing color scheme.

This advance has also brought about a considerable simplification in manufacturing operations. The outer side sheet of a steel body itself (as well as the cowl) used to be an assemblage of several smaller stampings welded together. Now each side is pressed from a single large sheet. Final assembly now consists essentially of erecting two sides, a rear, a cowl, and a rear seat pan. (The floor and front seat are carried by the chassis.) In this manner, as is so often the case, an improvement in utility has resulted in a change from the complex toward the simple.

As an instance of the older method, take the sketch

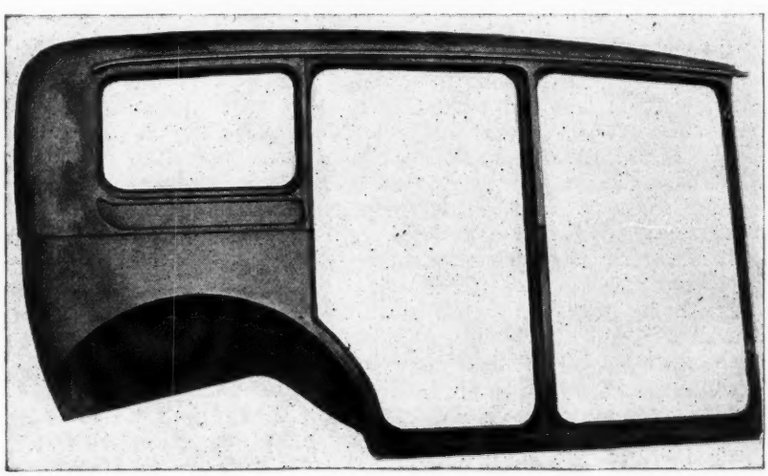


Fig. 2—Outside of a sedan side made from a single sheet 100 by 66 by 0.043 in. Drip molding and a few door fittings have been welded in place

of a cabriolet side (Fig. 1). It could readily be made of three stampings, the roof panel *A* welded to the rear quarter *B* by a flash weld at seam *K*, and this part then fixed to the side panel *C* along an inner lap seam *a* by a number of spot welds. This side unit, properly fitted with hinges, upholstery lugs, seat brackets and miscellaneous hardware, would then be connected to the cowl *D* by welds *f* at the top of the windshield frame and by a sill *E* at the bottom.

In the new design parts *A, B, C, E* and their strengthening flanges are in one piece, as shown by the photograph of the sedan side sheet, Fig. 2. There is not a single joint in this piece. While such a production requires a line of very large presses, with correspondingly large dies, it avoids much making and fitting of smaller pieces and expensive filing and smoothing of exposed welds.

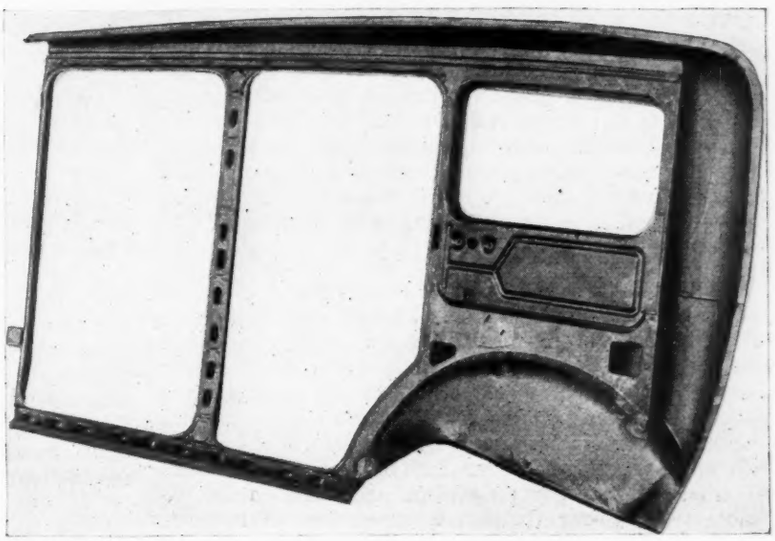


Fig. 3—Inside of sedan side made from a single sheet. An inner reinforcing wall of smaller parts will later be welded on to give rigidity against lateral buckling

It might appear that the door and window openings would make an undue amount of scrap, but on account of the heavy flange forming the door frame, clearly shown on the inside view of Fig. 3, the actual opening punched from the flat sheet is not excessive and much of it is utilized in making smaller parts. The metal apparently missing has been turned inward where it will be useful in carrying load.

At any rate, the alternative of making a single big stamping or welding together a number of smaller ones had to be decided by balancing the cost of welding jigs plus the welding and finishing labor against a possible increase in tool cost in the press shop. A one-piece stamping has this additional merit: It is better able to withstand the stresses of service than a jointed pieces and expensive filing and smoothing of exposed welds.

While it has not been easy to build up a set of dies which will make such a stamping as shown in Fig. 2 without splitting or wrinkling the sheet at any corner (nor has it been a simple matter for the steel makers to produce deep-drawing stock with excellent surface in sizes as large as 100 by 66 in.), the Budd tool engineers have succeeded so well that they now find other production problems to be simplified by handling a few large stampings rather than a greater number of small ones which must be welded to gain the desired result.

A collateral advantage of importance has been found in final assembly and shipment. Some variation in size is inherent in any fabricated piece. Thus, each stamping has a tolerance of a small fraction of an inch (which may be denoted plus or minus T) largely due to the varying "springiness" of individual sheets. Each welding operation has a tolerance (plus or minus t) due to play in the fixtures, clearance between work and fixture, and varying shrinkage from varying welding heat.

Plus and Minus Errors

Sometimes in assemblies, such as shown in Fig. 1, these plus errors cancel the minus errors, and the side sheet is close to theoretical size. But there is the possibility that the errors may be cumulative, and the final tolerance of the cabriolet side sheet consisting of three stampings and two welds must be plus or minus $(T_1+T_2+T_3+t_1+t_2)$.

Obviously such accumulation in errors are avoided in single stampings. A single tolerance governs. This means not only that a steel door will fit the opening and hang accurately in its frame with a minimum of fitting (and a large amount of expensive skilled labor is saved on this item alone), but that the four units which now make up a body—namely, right and left side, rear, and cowl—may be nested in a freight car, shipped in maximum carloads and assembled economically elsewhere.

Space does not permit a detailed account of the manufacturing operations at the Budd plant. The most interesting part of the story is the economic phase discussed above. Manufacturing follows the routine seen in any well-ordered metal fabrication plant, somewhat magnified by the size and quantity of material handled.

Presses range in size from a line capable of working the 100 by 66 in. sheet for a sedan side to small ones for the minor fittings. Many of the important machines are double acting, with finger dies mounted on air cushions to aid in

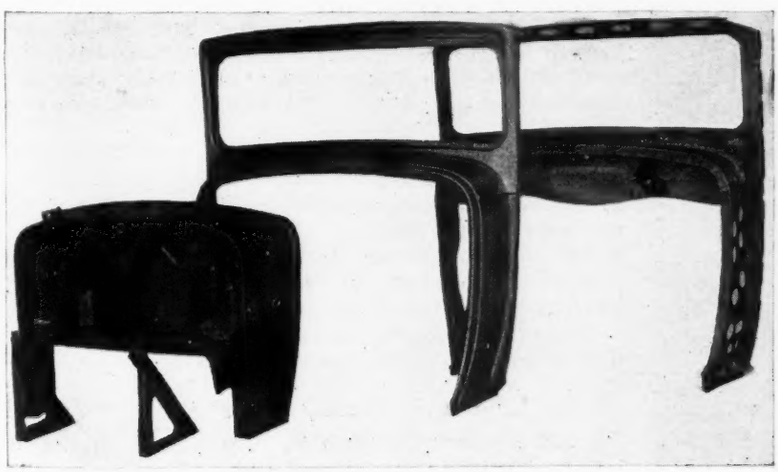


Fig. 4—Front quarter of car is made from cowl (center, a single stamping), inner diaphragm, dashboard, and floor brackets

aligning the work and equalizing the pressures on all parts of the die and throughout all parts of the stroke.

The press shops are roomy, and the massive units are spaced far enough apart so smaller machines can be moved up to the proper place to put in a hole or two or make a bending operation as required. In this way much backtracking is avoided, while wide aisles and side bays permit such grouping of machinery without interfering with transport of material in process.

Material Handling

Metal in process is handled in a variety of ways adapted to its shape and size. Flat sheets are carried on flat-bottomed four-wheel wagons. Scrap is loaded into metal box cars with open tops and small castor wheels. Stampings which nest closely together are stacked on raised platforms and moved by electric lift tractors. Door frames are hung on special truck bodies with appropriate cross arms. Storage battery motors are used for transport; elevators are large enough to handle two two-car trains. Such equipment is most flexible, and can be adapted to the requirements of changing production with ease.

Steel doors are made in such quantities that a special shop is utilized for door construction exclusively, complete with press department, welding machines, inspection and finishing floor. Another section of the plant is devoted to cowls. In the most advanced design this is made as shown in Fig. 4.

The cowl proper and windshield frame, which carries the exterior finish, is a single piece. It is stiffened into a load-carrying structure by an inner diaphragm, punched for lightness, and made of several smaller stampings. Welds in the latter are placed where they will be covered by inner trim, and in this way some scrap from door and window openings is utilized. The same may be said of the dashboard or false cowl, which performs the function of strengthening the front assembly against racking.

These various sub-assemblies are then welded to the combined cowl and windshield frame by a series of resistance spot welds, made in specially developed fixtures and machines, leaving no mar on the exterior surfaces. In this way the front end of the all-steel body is manufactured into a single rigid unit.

Minute Inspection

Minute inspection is given the units as they progress and also a final inspection before shipment, not only for size and shape, but also for surface finish. Minor defects are corrected by hammering and filing. In order to avoid an undue amount of work at this point it is essential that the outer sheets come from the presses without wrinkle, and that much care be exercised in handling the metal in all further stages. There would be ample opportunities for sheet metal to meet the protruding edge or corner of a machine, a truck or another piece, and each such collision leaves a small dent, sometimes almost too small to see, but one which must be removed before the panel can be given the smooth, mirror-like finish demanded by motorists.

In order to prevent rusting in transit, the body or body-sections ("in the white") are oiled inside and out with a fine spray. After reaching the finishing plant another inspection is made to reveal any damage in transit.

Subsequent finishing operations first require scrupulous cleanliness. The body goes through an electric oven to burn off the oil. Then it is washed with a chemical cleanser, scrubbed with steel wool, douched in cold water and again in hot water. After drying, the body gets a coat of priming paint, a two-hour journey through an oven, and then a second priming coat and drying.

Then the body is carefully and thoroughly smoothed with fine emery and running water—the most laborious process in the whole course of manufacture. Three double coats of lacquer are then sprayed on, each coat being followed by a trip through a long drying oven. Then comes a second rubbing with fine emery paper and oil, and a last spray of colorless solvent to remove scratch marks.

After the upholstery is placed, the interior panel work done, the top covered, the hardware placed and the glass set in the trim shop, the body is polished all over with a powdered abrasive in wax, rubbed down with woolen cloth, and is ready for the automobile plant. Reaching final assembly, it is lowered over the chassis frame, and connected thereto by a series of horizontal bolts, becoming then an integral part of the general mechanism.

Russia's Automotive Program

ACCORDING to the *Vie Economique des Soviets* of July 15, at one of its last sessions the Economic Council of the R.S.F.S.R. received a report of Mr. Sorokine on the future of automobile production in Russia.

The production of trucks of 3½-ton capacity at the Yaroslav Works has been retarded by the lack of engines of sufficient power. The automobile trust (of the Soviet Government) has made an arrangement with the German Daimler firm whereby the latter will supply the engines and also will furnish technical assistance. Russian engineers and workmen will be employed in the Daimler factory in order to develop their knowledge of the subject. The automobile trust plans to enlarge the Yaroslav Works and to increase production to 600 trucks per year.

The Amo Works this year will turn out 280 trucks, and next year the number will be increased to 1300. This increase in production will be possible if there is no delay in the delivery of machinery necessary for the reequipment of the plant.

The new automobile factory now under construction will have a capacity of 12,000 cars per year. The automobile trust has secured the technical collaboration of American, German and British firms in the construction and equipment of the works. The cost of construction of the new plant will amount to nearly 40,000,000 roubles and the plant will be completed in three years. During the intervening period the country will be supplied with automobiles assembled from parts imported from abroad. It will not be necessary, however, to import all of the parts, as the bodies, glasses, etc., can be manufactured in Russia.

At present the automobiles in use on the roads of Russia are of a large variety of makes, which is not at all favorable to local production of cars. It will be necessary to limit the types to a small number specially suited to the conditions obtaining in the country.

In order to organize a corps of specialists the Autotrust has taken steps to adapt its program of production to that of study in the higher technical schools. It has been proposed to exchange specialists with foreign countries.

THE Peugeot interests in France have organized the Compagnie Lilloise des Moteurs with a stock capital of 35,000,000 francs to manufacture Peugeot Diesel engines under Junkers license.

Automotive Industries
September 15, 1928

Britain Issues *New Rules* Covering Truck *and* Bus Design

Vehicles meeting latest requirements are permitted to carry heavier loads than have hitherto been legal. Limit fixed on overall length and rear overhang.

By M. W. Bourdon

A NEW set of regulations was brought into force recently in Great Britain concerning the unladen and laden weights and dimensions of four-wheeled and six-wheeled trucks and buses exceeding two long tons unladen weight.

The order of the Ministry of Transport setting forth these regulations permits heavier loads to be carried than have hitherto been legal, though to secure that benefit certain features of design and certain specified dimensions must be complied with. Existing vehicles that fail to conform may continue in use but are not entitled to the new privileges. For instance, an existing six-wheeler failing to comply with the new constructional requirements is governed by the old unladen weight limit of 7¼ long tons instead of the new limit of 10 tons.

For the first time a limit is fixed on overall length and rear overhang. In the case of four-wheeled trucks the maximum overall length (excluding the starting crank) is 27 ft. 6 in.; for six-wheelers it is 30 ft., while for a vehicle drawing a trailer it must not exceed 26 ft.

Overhang behind the rear axle of trucks must not be more than 7/24ths of the overall length whatever the latter may be, or 6 ft. in the case of a tractor. The overhang of a conventional six-wheeler is measured from a point 4 in. behind a point midway between the rear axles. Thus the maximum overhang of a four-wheeler is 96¼ in. (7/24ths of 27 ft. 6 in.) and of a six-wheeler 105 in. (7/24ths of 30 ft.).

In the case of four-wheeled trucks the maximum laden weight of any one axle must not exceed 8 tons, the total axle weights laden must not be more than 12 tons and the unladen weight is limited to 7¼ tons. (Long tons are concerned in each case above and hereafter.)

Six-Wheel Vehicles

Six-wheeled freight machines of which the distance between the two back axle centers is not more than 54 in. and the wheels of which, if fitted with other than pneumatic tires, have a rim diameter of not less than 670 mm., have a maximum laden weight of 7½ tons for any one axle, so long as the sum of the three laden axle weights does not exceed 19 tons or the unladen weight 10 tons. To secure the right to those axle weights, however, the six wheels must all be in contact with the ground on any road contour, unless to comply with that condition it would be necessary for the middle axle to be 6 in. or more above or below a straight line drawn between the centers of the front and rearmost axles. Under any conditions of loading, too, the ratio of weight on the middle axle to that on the rear axle must remain constant.

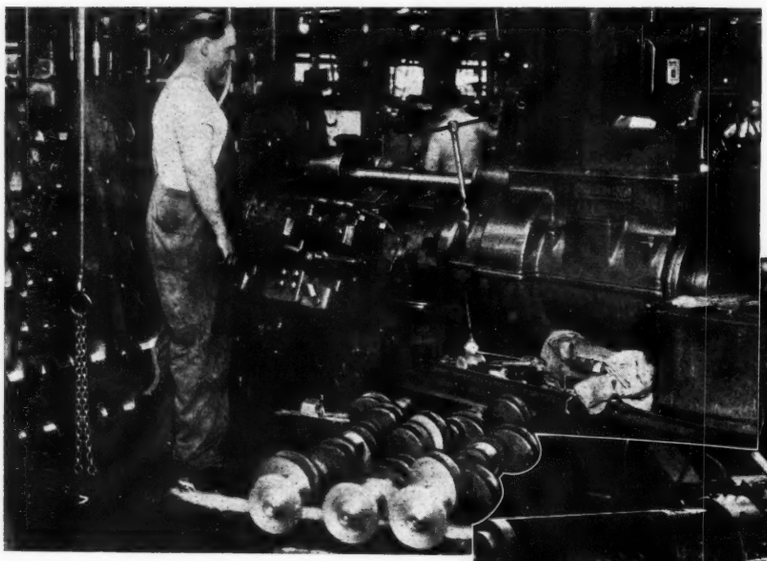
In the case of buses, the overall length and overhang limits are the same as for trucks, but the laden weight of any one axle of a four-wheeler must not exceed 5½ tons, nor the total axle weight 9 tons. For six-wheelers the corresponding limits are 4½ tons and 12 tons. The laden weight of a bus, it may be added, is reckoned as the unladen weight of the vehicle ready for service plus a weight calculated by allowing 140 lb. for the driver, conductor and each passenger the vehicle is licensed to carry.

Maximum Turning Circles

Maximum turning circles are specified in the order for buses and coaches. These must not exceed 60 ft. in diameter when the overall length is 26 ft. or less, or 66 ft. in diameter if the overall length exceeds 26 ft. A minimum ground clearance is set for four-wheelers as follows: For a distance of 14 ft. 6 in. rearwards from the front of the vehicle, or up to the rear axle, it must not be less than 10 in., plus an allowance for wear of tires, sagging of springs and other causes likely to reduce it. This limit extends for a distance on either side of the chassis center line of not less than one-third of the front wheel track. The same minimum is set for six-wheelers, though the distance rearwards is 13 ft. instead of 14 ft. 6 in.

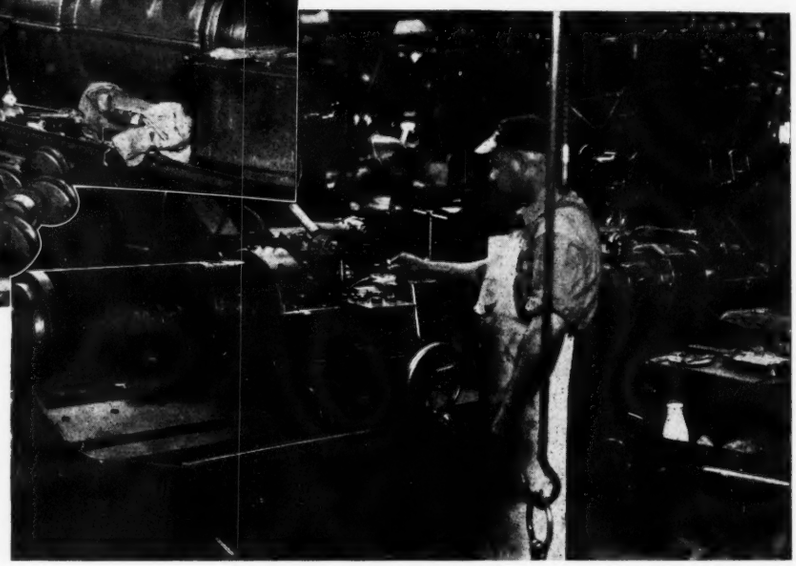
The order deals also with the brake equipment of both trucks and buses (four-wheelers and six-wheelers). It specifies that every vehicle must have at least two sets of brakes, entirely independent, either of which will, even under the most adverse conditions, prevent all except the steering wheels from revolving. The mechanism must be such that the failure of one brake set does not adversely affect the other, though one drum may be common to two sets of brake shoes or bands. At least one brake set must act directly upon the wheels and not through the transmission.

An important point to be noted is that although the regulations specify 27 ft. 6 in. and 30 ft. respectively as the maximum overall lengths for four and six-wheeled passenger vehicles (as well as for trucks), local licensing authorities have the option, and are exercising it in accordance with suggestions from the Ministry of Transport, of refusing to license a bus exceeding 26 ft. in length, unless they consider that special circumstances warrant the full legal maximum. To a large extent this option nullifies the concession of greater length embodied in the order.



Above—In this LeBlond lathe Nos. 2, 3, 5 and 6 line bearings are turned and their webs faced

Below—In LeBlond and Wickes lathes the preliminary turning operations on Reo crankshafts are performed



Reo Crankshaft Machining Methods Include Final Hone Dressing

Operation removes any suspicion of roughness and permits use of part for heavy-duty service as soon as it is assembled in engine. Crankshaft production program described.

By K. W. Stillman

WHILE there are generally only minor differences between the design of major components used by one automobile maker and those used by others, and consequently a general similarity in the production methods employed to manufacture them, there are usually rather wide divergences in detail production methods.

In the plant of the Reo Motor Car Co., at Lansing, Mich., practically all the parts used in Reo cars and trucks are produced. Here, as in other plants, the production methods employed are generally those in common use. On the other hand, Reo engineers have developed a number of detail refinements in their practices and these methods as applied to the production of a number of major component parts will be described in several articles of which this is the first.

An interesting production program which has been laid out for Reo crankshafts will be described here. The feature of this production line is undoubtedly the last operation in it.

After passing through all the customary operations designed to give accurately sized bearings and pins with very smooth surfaces, the Reo crankshafts are given an additional dressing in a Schramer crank hone. An almost imperceptible amount of metal is removed from the pins and bearings in this operation but any suspicion of roughness is removed so that the crankshaft is ready for heavy-duty service as quickly as it is assembled in the engine.

In addition to this operation, which is rather unusual in present crankshaft machining practice, Reo employs a series of operations which, both in sequence and in tools employed, vary somewhat from customary methods.

The first operation, in a LeBlond lathe, is to rough turn the center bearing and face the webs, after which this bearing is spot ground in a Landis grinder to provide a proper location for the lathe operations to follow on the rear end of the crankshaft.

The rear bearing and the drive flange web are spot turned in LeBlond lathes after which the rear pilot on the driving flange is spot turned and the rear bear-

ing and driving flange finish turned. Length of the bearing is held to plus or minus 0.001 in.

In another LeBlond lathe the oil slinger at the rear end is finish turned and the flange faced, followed by another lathe job in which the stub end and the front bearing are rough turned and the web faced. The permitted tolerance on the length of the front bearing is plus or minus 0.005 in.

The pilot is then faced, a ⅛ in. radius cut and the rear end recentered in a LeBlond lathe, after which the front end is faced, burred and recentered in a Flather lathe. The flange is then undercut and the pilot and bolt boss finish-turned in another LeBlond lathe.

The first rough grinding operation is performed on the center main bearing in a Norton grinder and is followed by rough grinding of the rear main bearing in a Landis and of the front main bearing in another Norton.

In a Milwaukee milling machine the web of No. 6 line bearing is milled for locating the crankshaft in a LeBlond lathe where Nos. 2, 3, 5 and 6 line bearings are rough turned and their webs faced. Length of all these bearings are given a tolerance of plus or minus 0.002 in. while the width of all cheeks may vary 0.005

THIS is the first of several articles which will describe production methods employed in the plant of the Reo Motor Car Co., for obtaining accuracy in engine and chassis parts. The articles to follow will tell how connecting rods, cylinder blocks, camshafts and other major components are manufactured.

bearings and all crank pins are turned to grinding size in a Melling crankshaft lathe.

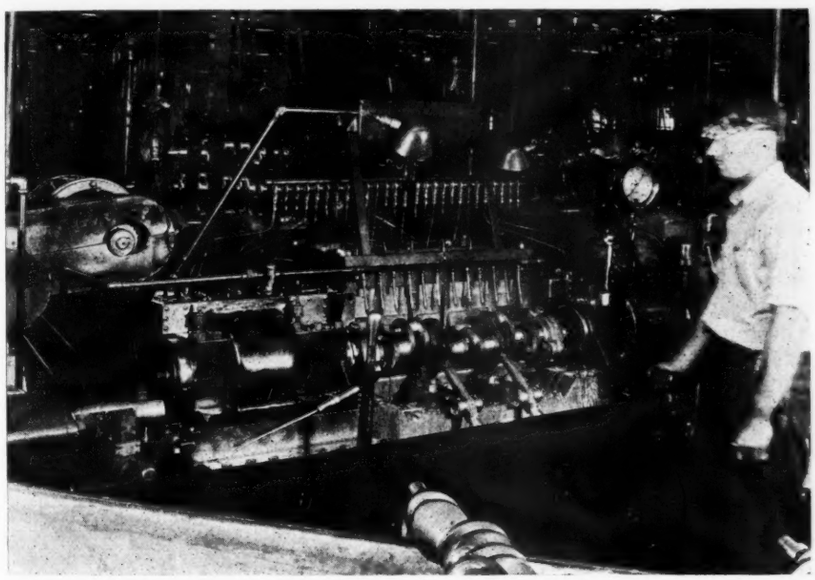
A 9/16 in. hole is drilled in each of the six crank pins in a Fox horizontal six spindle drill press and these holes are then rough and finish counterbored and countersunk ⅛ in. deep in two Barnes drills.

In four L. & G. drills, two-spindle and two single-spindle, a 5/16 in. hole is drilled in each line bearing, the first pair of drills working on Nos. 2, 5 and 7 bearings. In another L. & G. three-spindle drill a 3/16 in. hole is drilled in all crank pins and the contour of all webs is then turned in a Walcott Melling contour lathe.

All webs are burred and the crankshaft is straightened to 0.004 in. in a hand press prior to pin grinding, and all oil holes in the shaft are peened.

Pins are ground in Norton grinders in three operations, the first including Nos. 3 and 4; the second Nos. 2 and 5 and the last Nos. 1 and 6 pins. Diameters are held to tolerances of 0.0005 in. plus or minus.

The shaft is again straightened before the bearings are ground. The center bearing is first ground to size and then the rear line bearing. Both operations employ Norton grinders



Above—Melling crankshaft lathes are employed to turn bearings and pins to grinding size

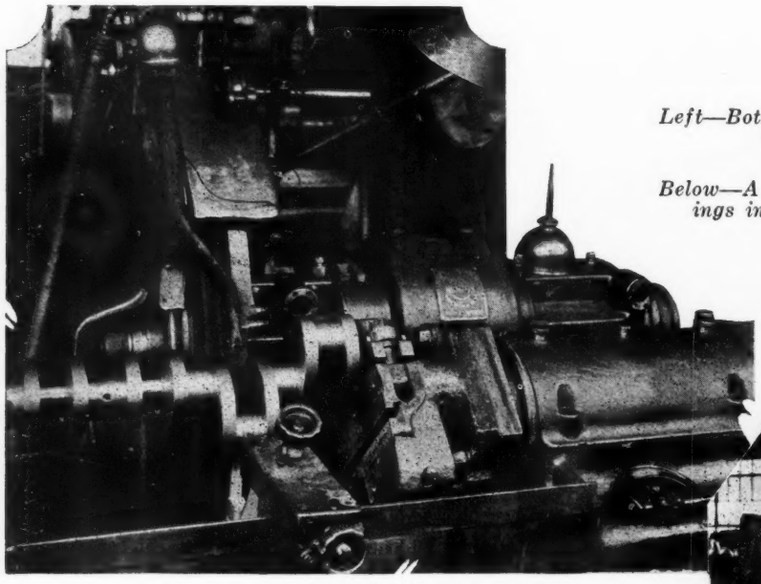
in. plus or minus the nominal size.

The next operation is performed in a Walcott pin turning lathe and all six pins are rough turned and the webs faced in a single operation. Width of the pins can vary from 0.001 in. above to 0.002 in. below nominal size.

Prior to the semi-grinding of the line bearings the shaft is straightened in a Gier hand press to 0.010 in. after which three Norton grinders are employed to semi-grind Nos. 4, 7, and 1 line bearings. The boring of three 19/32 in. radii in the driving flange follows the semi-grinding operations.

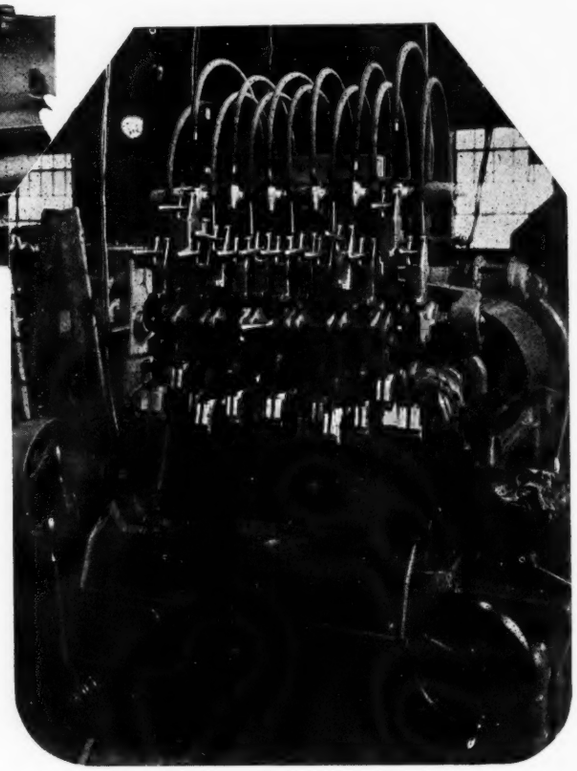
Another straightening operation follows and Nos. 2, 3, 5 and 6 line

Below—All six pins are rough-turned and their webs faced in a single operation in this Walcott pin-turning lathe



Left—Both pins and bearings are ground to size in Norton grinding machines

Below—A final finish is put on both pins and bearings in a special Schramer honing machine



and tolerances allowed are the same as for crank pins and other bearings, plus or minus 0.0005 in.

After the rear bearing is ground the recess between the oil slinger and the driving flange is ground and then the outside diameter of the flange is ground to size. Plus or minus 0.005 in. tolerance is permitted in the recess diameter.

In the next two operations in Norton grinders, Nos. 5 and 6, and 2 and 3 line bearings are ground to size followed by grinding the No. 1 bearing and the pilot gear fit. Permitted tolerance in diameter of the pilot gear fit is plus or minus 0.001 in.

Both Cincinatti and Kent-Owens milling machines are employed to mill the ¼ and No. 15 Woodruff keyways in the front end of the shaft. These operations are followed by drilling ⅞ in. hole in rear and 13/16 in. and 1 1/32 in. holes in the front end in Barnes drills.

A semi-final straightening to 0.001 in. is performed by means of a special fixture. More boring and reaming operations and finish facing of the driving flange take place in a Warner & Swazy turret lathe, after which the front end of the shaft is tapped in a Pratt & Whitney thread miller.

The six holes through the driving flange are drilled and reamed on a Baker two-spindle drill, each spindle of which carries a multiple head. This is followed by an operation on a Cincinnati drill in which both sides are countersunk, after which the shaft is again straightened in a special fixture to 0.001 in.

Balancing operations follow and the shaft is burred and cleaned. The clutch pilot bushing is assembled with the crankshaft and it then is placed in a Schramer crankshaft honing machine where it is given a last final dressing as described previously.

A final straightening operation, if necessary, then prepares the piece for final inspection.

FOUR American teams of three cars each, the makes represented being Studebaker, LaSalle, Hupmobile and Chevrolet, took part in the 1092-mile Alpine Tour from Milan, Italy, to Munich, Bavaria, over the highest peaks in Europe.

The competition united 84 competitors, of which 34 finished with clean scores. Conditions called for a minimum and a maximum speed, according to the size of the engine, any variation between these limits entailing the loss of points. The passes to be tackled comprised the St. Gothard, Stelvio and the Simplon, at altitudes of more than 8000 ft., and provided conditions recognized as the most strenuous in the world. In Class B the Studebaker team finished in a total time of 94 hr. 13 min. In Class C the Hupmobile team finished in 108 hr. 23 min., while two out of the three LaSalles totaled 79 hr. 39 min. The Chevrolet teams did not qualify.

Two teams, the Belgian Minerva and the Italian O.M., tied for first place. Both these teams were in the 122 cu. in. class.

A NEW Rolls-Royce aircraft engine, the Type F, was recently publicly demonstrated for the first time. Its feature is very small frontal area and it is said to consume less fuel than any other engine of its class. The engine has 12 cylinders in two monobloc sets. It is estimated that the improved performance of this engine will make it possible to build a bomber which at 15,000 ft. altitude will have a speed 30 m.p.h. greater than any other machine in the British air service. A considerable number of the engines have been ordered by the British Air Ministry.

New Daimler-Benz *Diesel* Operates *on* Antechamber Principle

Equipped, however, with Bosch fuel pump and injection valve. Electric heater provided to facilitate starting. Engine develops 70 hp. at 1300 r.p.m. Has six cylinders.

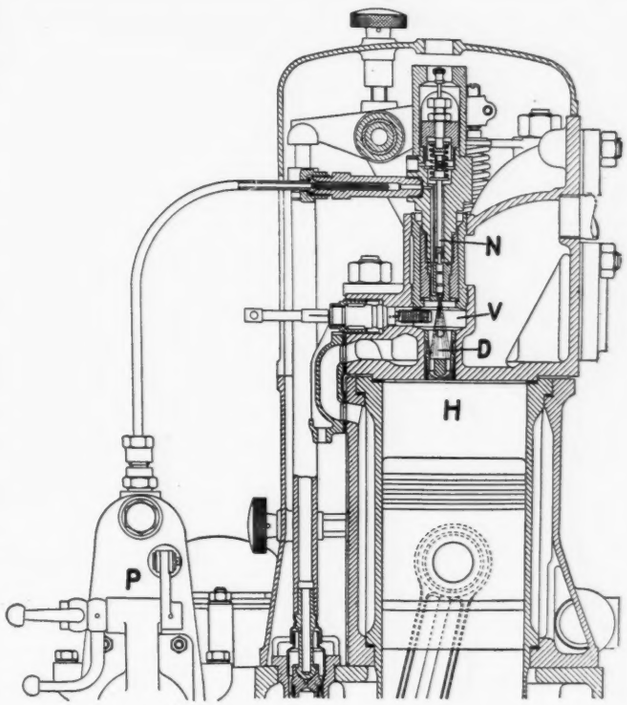
THE following technical details of the six-cylinder Diesel engine for motor trucks which the Daimler-Benz Motor Co. of Germany has been manufacturing for about a year and which was recently introduced on the British market is taken from an article by Ludwig Hausfelder in *Der Motorwagen* of Aug. 20. It is interesting to note that although the Bosch fuel pump and injection valve are used the engine works on the antechamber or ignition chamber principle, while the Bosch equipment is ordinarily used for direct injection into the combustion chamber. The use of the antechamber system is probably explained by the fact that the Benz company has had long experience with it, a particular design of antechamber engine having been patented by it as long ago as 1909.

Mr. Hausfelder in his article briefly enumerates the advantages and disadvantages of the antechamber principle. Owing to the fact that the pressure produced in the antechamber by the ignition is substantially the same as that used in so-called air injection engines to introduce the fuel by air pressure, this system is well adapted to thoroughly distribute the fuel throughout the combustion chamber and to produce a high degree of turbulence therein. This is of the highest importance from the point of view of rapid ignition and combustion. Another advantage is that the pressure on the fuel required for the injection of same is much lower than where the fuel is injected directly into the combustion chamber, pressures up to 4500 lb. p. sq. in. being not uncommon in direct injection engines, while with antechamber engines pressures of 900 to 1500 lb. p. sq. in. are sufficient. These lower pressures should result in greater reliability and longer life of the pumps and injection valves. Finally, it deserves to be pointed out that the combustion pressure of about 500 lb. p. sq. in. is very little above the compression pressure.

Fuel Consumption Greater

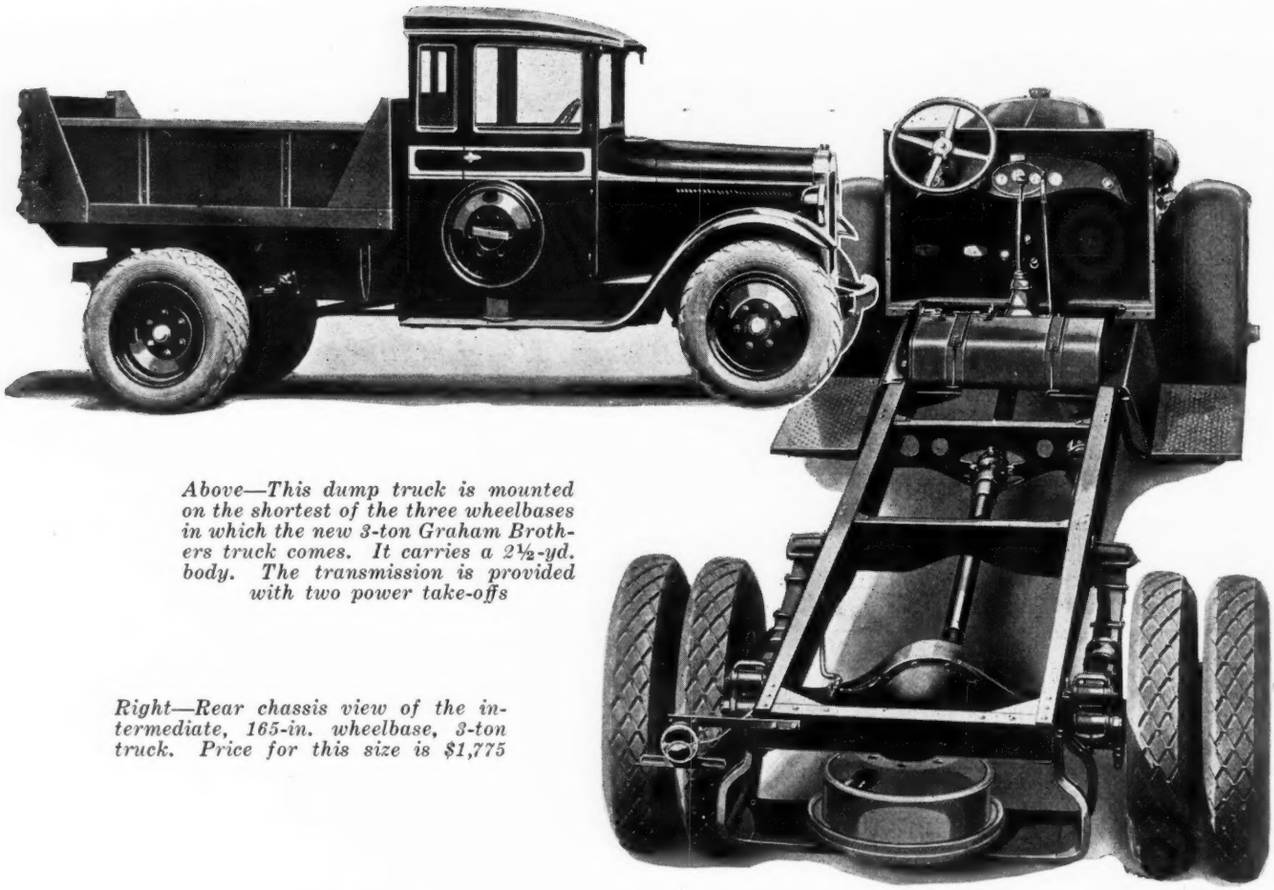
The disadvantages of the antechamber engine are that its fuel consumption is about 10 per cent greater than that of an engine with direct mechanical injection and that its control is somewhat dependent on the momentary temperature of the antechamber. This latter disadvantage is of no consequence when, as in the Daimler-Benz engine, the antechamber is completely water-cooled, so that the temperature of its walls does not differ much under various operating conditions. One disadvantage not mentioned by Mr. Hausfelder would seem to be that an ignition chamber at the center of the cylinder head cuts down the available space for the valves and makes necessary the use of slightly smaller valves.

As in most engines working on the antechamber principle, special provisions are made in the Daimler-Benz engine to facilitate starting. As long as the walls of the passages between the cylinder and the antechamber are comparatively cold, the air flowing from the cylinder into the antechamber will give up much of its heat to these walls and the temperature within the antechamber will then be insufficient to assure positive ignition. For this reason the air in the antechamber is heated during the starting period by means of an electric heater provided with a spark plug thread and screwed into the wall of the antechamber.



Cross-section of Daimler-Benz Diesel engine

The engine has a bore of 4.14 and a stroke of 6.50 in., and it develops 70 hp. at 1300 r.p.m. Between 600 and 900 r.p.m. the mean effective pressure is substantially constant at about 110 lb. p. sq. in., while at higher speeds it falls off and at 1300 r.p.m. has a value of 99 lb. p. sq. in. The fuel consumption varies from a minimum of 0.44 lb. p. hp.-hr. at 1000 r.p.m. to 0.55 lb. p. hp.-hr. at 400 r.pm. The engine is said to be unusually elastic and to pull well on hills. The weight of the engine is about 20 lb. p. hp. and the 5-ton Daimler-Benz truck chassis equipped with this engine weighs 8470 lb.



Above—This dump truck is mounted on the shortest of the three wheelbases in which the new 3-ton Graham Brothers truck comes. It carries a 2½-yd. body. The transmission is provided with two power take-offs

Right—Rear chassis view of the intermediate, 165-in. wheelbase, 3-ton truck. Price for this size is $1,775

Graham Bros. in Heavy-Duty Field With Three-Ton Truck

Number of units are interchangeable with those on 2½-ton model, but front and rear axles, springs, steering gears and brakes are new. Prices $1,745-$1,845.

By A. F. Denham

GRAHAM BROTHERS enters the heavy-duty truck field with the announcement of the addition of a 3-ton truck to its line of commercial vehicles. Chassis prices for the standard models without cab range from $1,745 to $1,845 for the different wheelbases.

Following previous Graham Brothers practice of standardization, a number of the units are interchangeable with similar ones on the 2½-ton truck, including the engine, clutch and transmission. The engine power and safety factor and size of the other two units were recently increased on the 2½-ton model in anticipation of the announcement of the 3-ton model.

Rear and front axles, springs, steering gears and brakes are new, however. The spiral bevel rear axle is similar in design with that in the 2½-ton truck but considerably heavier. The standard reduction ratio is 7⅛ to 1. Pinions are straddle mounted on three ball bearings, two outside and one inside. Wheel bearings are double Timkens front and rear. Axle shafts are of nickel steel with a diameter of 2⅞ in. at the wheel hubs and 2 1/16 in. at the inner ends. An electric steel casting is used for the housing.

Front axles similarly are of the same general design as those on the 2½-ton truck but heavier. They are provided with flat roller thrust bearings in the steering knuckles. Steering gears are of Hannum manufacture and of the nut and lever type, with a variable ratio to provide easy steering at the center of the screw on which the three thread nut rides. The screw shaft is mounted on ball bearings at both top and bottom. Tie rods are of the ball and spring socket type.

Frames on the two shorter wheelbase models, 135 in. and 165 in. respectively, are very similar to those of the 2½-ton truck. On the long wheelbase (185 in.) edition of the new truck the stock thickness is ¼ in., which is 1/16 in. heavier than on the other two. The channel depth also is increased to 7½ in., and the

flange width to 2⅞ in. Frames have four cross-members aside from the front channel bumper (which is virtually a cross-member), the rear engine supports and the tie rod between the rear spring rear shackles.

Both front and rear springs are heavier than on the 2½ ton. Front springs are 39 in. long and 2½ in. wide, and rear springs 56 in. long and 3 in. wide. The front spring eyes of the rear springs are of the double wrapped type, two leaves encircling the eye bolt. As mentioned, a full length shackle bar extends between the rear spring rear shackles.

Lockheed internal four-wheel brakes are used on this model, the same as on other Graham Brothers trucks. Rear brakes have a considerable excess of braking area with 3¼ in. lining width as against 2¼ in. for the front, both drums being 16 in. in diameter. As compared with the 2½-ton truck, the pedal leverage is higher. The master cylinder is of the submerged self-refilling self-compensating type.

Standard tire equipment is 32 by 6 in. all around, with duals at the rear, mounted on disk wheels. Optional tire equipment at extra cost includes only pneumatics. The two other combinations are 34 by 7 all around with duals at the rear and 34 by 7 front and 36 by 8 singles at the rear.

Following are major characteristics of the new truck models:

Wheelbase	Designed for	Price	Body length	Body allowance	Chassis weight
135	Dump and tractor..	$1,745	2½ yd. dump	2000 lb.	4225 lb.
165	General haul	1,775	12 ft.	1700 lb.	4520 lb.
185	Furniture vans, etc.	1,845	15 ft.	....	4540 lb.

Composition of Cracked Motor Fuels

SOME work on the chemical composition of motor fuels produced by the cracking process has been done in England by Prof. J. S. S. Brame and T. G. Hunter, and the latter read a paper at a meeting of the Institution of Petroleum Technologists in London entitled "The Composition of Cracked Distillates," in which the results were discussed.

It was explained that no attempts at a quantitative analysis have yet been made even of the oil with which the cracking stills are charged, as the difficulties are too great.

Cracked distillates generally contain all the four classes of hydrocarbons—paraffins, unsaturateds, aromatics and naphthenes. But even the estimation of the bulks of the different classes is in an unsatisfactory state. Cracked spirits contain more unsaturateds than straight-run petrol, and this feature, first considered undesirable, is now regarded as an advantage, because unsaturateds do not tend to detonate. In consequence, cracked petrols command in America higher prices than ordinary petrol. Sticky yellow gums are, however, liable to separate from cracked spirits on storage and to give trouble in the engine. These gums are regarded as oxidization products of diolefines. Messrs. Brame and Hunter stated that no such product had, so far, been isolated from cracked spirit.

Their own work has been devoted to the separation, on the one hand, of unsaturated and aromatic hydrocarbons from the saturated paraffins and the naphthenes, and, on the other, to the much more difficult separation of the latter two classes of compounds. Though not completely successful, they had developed methods for a reasonably high degree of separation of the former group, and they had applied these methods to the investigation of a commercial cracked spirit produced in a Cross plant from a Russian kerosene, which was the direct plant distillate, and had not undergone any of the present refining treatments.

Turn to Chemical Methods

In the first instance, Messrs. Brame and Hunter tried to isolate the unsaturateds and aromatics by the use of selective solvents, viz., methyl-alcohol, solution of sulphur dioxide in acetone, nitrobenzene, aniline and dimethyl aniline, applied to both the cracked spirits and their various fractions. The results were unsatisfactory. They then turned to chemical methods; that is to say, the removal of the more reactive constituents (in this case the unsaturateds) by conversion into easily isolated derivatives, and then recovering the other constituents (the aromatics) by transforming them into sulphonic acids and hydrolyzing these acids. As in the previous line of research, several of the methods tried had been known for forty years and more. One of these was mercuration, that is, treating the hydrocarbon with mercury acetate, or some other mercury salt, and decomposing the resulting compound by distillation with hydrochloric acid. Again the yields were very poor, owing to secondary reactions and other working losses.

But bromination of the unsaturated portion and subsequent treatment of the product with a zinc-copper couple in neutral alcoholic solution proved successful, first in the case of amylene, with which yields of 91.5 per cent were obtained, and then with the light and heavy fractions of cracked spirits. For the second part of the problem, isolation of the paraffins and naphthenes, fractional distillation seemed to be the only method available. In conjunction with D. L. Samuel, Messrs. Brame and Hunter found, however, that this fractionation could be greatly facilitated either by adding a third substance of suitable boiling point to the mixture, or by passing the vapors from the mixture through that third substance. In the case of low-boiling constituents, aniline appeared to be the best substance to improve the distillation, and this line of research is also promising.

THE use of other motor fuels than gasoline produced from crude petroleum either by distillation or cracking and distillation probably has nowhere reached a greater scale than in Germany. During 1927 gasoline from imported petroleum constituted only 63.1 per cent of the motor fuel used in that country, while benzol constituted 35.3 per cent. The total amount of gasoline used in the country was increased by 8000 tons produced in Germany by the distillation of lignite, this constituting about 0.9 per cent of the total motor fuel consumed. The third motor fuel used is alcohol, of which 14,000 tons (1.6 per cent) were burned in engines during 1927.

MOTOR transport is making great progress—relatively—in Persia, according to the report of a British trade commissioner in that kingdom. During the fiscal year 1924-25 there were registered 529 motor cars and 103 motor trucks, while in 1926-27 the corresponding figures were 1330 and 967.

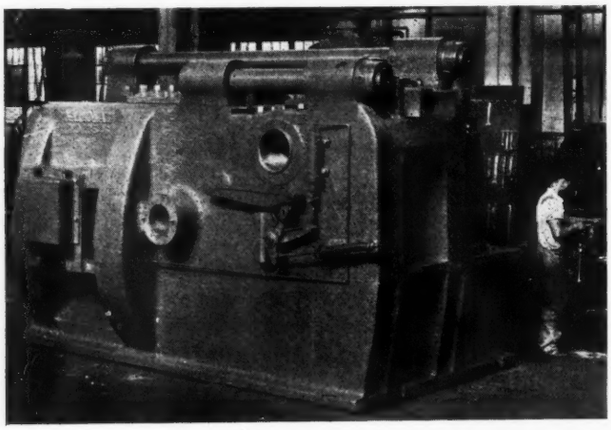
TWO new Hartness dies, Nos. 8-H and 10-H, designed to use with heavy machinery, have been developed by Jones & Lamson Co., Springfield, Vt. The smaller die has a capacity from 1½ to 2½ American national coarse thread series and the larger size has a capacity from 2 to 3.

NEW DEVELOPMENTS—Automotive

National Forging Machines

SOME rather remarkable performances were obtained from the new high-duty forging machines developed by the National Machinery Co., when they were demonstrated recently in the company's plant at Tiffin, Ohio.

The most interesting feature of the operations was



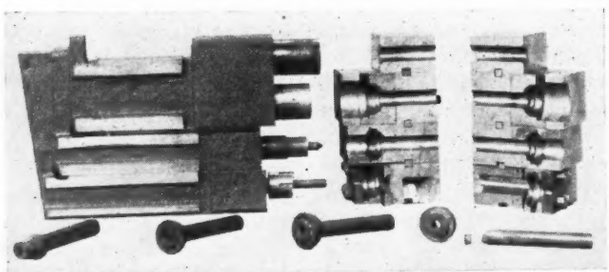
The bed frame of a new National Machinery Co. 5-in. forging machine showing the massive tie bars and extreme depth of the construction

the accuracy and subsequent economy of material with which forgings were produced. Transmission and differential gears were forged to within 1/32 to 1/16 in. of final size. Ball and roller bearing races, 3 in. in diameter, were held within tolerances of 0.010 in.

Even greater economies appear to be offered by the development of internal displacement forging by means of which holes are formed in the forging machine so near final dimensions that drilling may be dispensed with and the holes finished by broaching or reaming.

Most of the forgings produced during the demonstration were without flash and where flash occurred it was so small that it was trimmed in the forging machine, no separate trimming operation being necessary. Another economy is found in the fact that a very large proportion of the machine-made forgings are sheared from the bar while hot, in the forging machine, thus dispensing with the shear machine and its crew as well as the extra cost of annealed stock needed for cold shearing.

To accomplish these results, the new forging machines have been made exceptionally rigid and sturdy. The



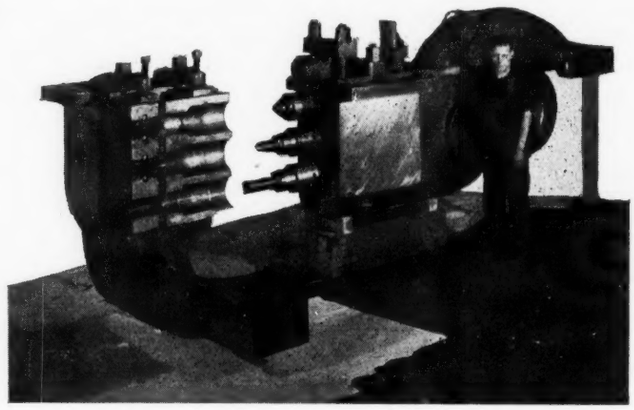
Dies employed in forging a differential gear

machines are short, compact and the depth and strength of the bed cross-section where forging strains occur are noticeable. A large percentage of the bed is placed below the floor line and two massive tie bars are located at the top of the bed to resist tension.

The heading and grip slides have also been altered considerably to aid in the production of more accurate forgings. The heading slide is made very long through the use of an overarm construction which extends over and beyond the crankshaft. The grip slide which carries the moving die also has a long outboard support which is important in securing close registration of the die impressions.

The new machines have also been made easier to operate by supplanting the old treadle clutch, which required the whole weight of the operator to work, by an air-operated trip which can be worked by the operator's toe.

A four-abutment starting clutch has been provided also to obtain fast starting. With this the machine starts in a quarter revolution or less of the main driving gear which permits faster operation, less temperature drop per forging and more forgings per heat from each bar.



This illustrates the outboard construction of the heading and gripping slides. These slides are used on the largest forging machine ever built—weight 365,000 lb.

Clipper No. 6 Belt Lacer

THE Clipper Belt Lacer Co., Grand Rapids, Mich., has brought out a new speed lacer designated as No. 6 which laces belts up to 6 in. wide. It is of the same type as the No. 8 lacer made by the company but is slightly smaller in size. A 6-in. belt can be laced in 1½ min., it is said, a pressure of 37,500 lb. being imposed on the belt by a three-quarter turn of the operating handle.

The lacer weighs 56½ lb. and may be bolted to a work bench or mounted on a special stand, as preferred.

Rough Service Lamp

AN electric lamp designed to withstand rough service such as that of a portable lamp used by mechanics has been developed by the National Lamp Works of the

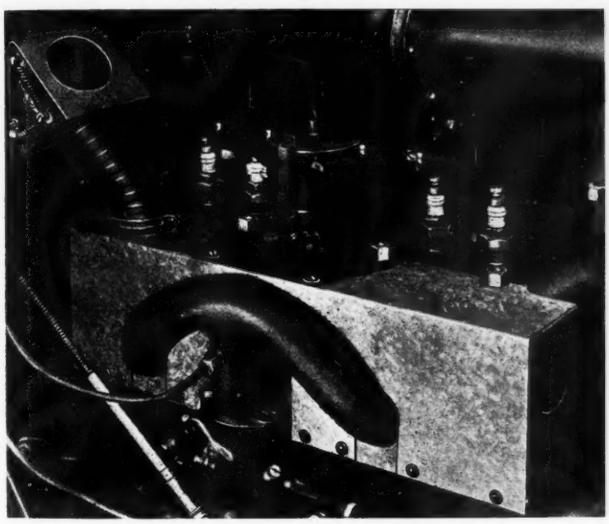
Parts, Accessories and Production Tools

General Electric Co. This lamp is a 50-watt A-19 inside-frosted Mazda. The new lamp will withstand an average of 15 to 25 drops of 3 ft., when inclosed in a regular wire service unit, compared with one or two drops for the regular 50-watt Mazda C lamp, according to tests reported by the company.

The coil filament is wound on a much smaller mandrel than that of the regular 50-watt lamp. Because of the smaller coils, the length of the filament is nearly three times that of the standard lamp. Instead of three supports found in Mazda type C lamps, the heavy-duty lamp has 16 supports. The lamp is further strengthened by the addition of a center row of supports which are closed about the filament tightly enough to prevent slipping due to shocks or bumps received.

Manifold Car Heater

A NEW manifold car heater has been developed by Stewart-Warner Speedometer Corp., Chicago, which possesses features quite different from other types of heaters. The valve operates



Stewart-Warner manifold car heater

through a strong spring mechanism which keeps it either fully open or tightly shut. In the latter position no heat passes to the car interior, making the heater a year-'round installation.

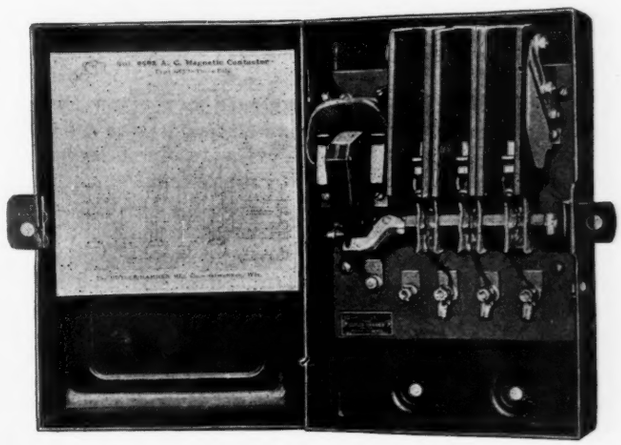
The conduit leading from the manifold is flexible, making installation easier and more adaptable to varying conditions. The register is installed in the dash while the valve is controlled by button and wire running from the dash.

THE L. S. STARRETT CO., Athol, Mass., has added to its line of hacksaw blades, No. 840 for hand saw use and No. 850 for power sawing. The new blades are made of special steel which is said to promote faster cutting and longer life. The blades come in 10 and 12 in. lengths for hand saws and in 12, 14 and 17 in. lengths for power service.

New Electrical Products

THE Cutler-Hammer Mfg. Co., Milwaukee, has recently added two items to its extensive line of electrical apparatus—a regulating rheostat and a new line of a-c. magnetic contactors.

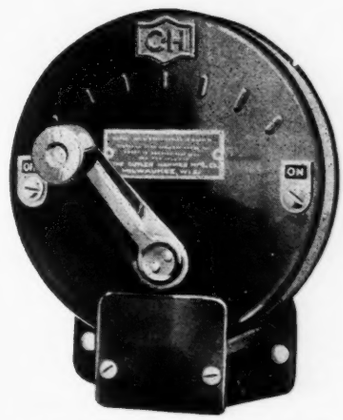
The latter are designed especially for automatically controlling lighting and power circuits and for miscel-



New Cutler-Hammer contactor

laneous applications. Two or three-wire control can be used and a wide variety of types and sizes are available. With two-wire control low voltage release is provided, while with three-wire control low voltage protection is provided. The line includes two, three and four-pole types with ampere capacity from 20 to 150 amp.

The new rheostat can be used to control the speed of fractional horsepower motors, as a lighting circuit dimmer and as an electric heat regulator. It is of the circular plate type completely inclosed. It is small, to



New Cutler-Hammer rheostat

permit mounting on machines or in out-of-way places. The standard device is furnished for conduit wiring, but a porcelain bushing can be quickly added for open wiring.

8 Hp. Morris "Minor" *is* Announced *for* British Market

Miniature four with 78 in. wheelbase and 42 in. track will sell for £125 to £135. Accommodates four adults. Has battery ignition and full pressure lubrication.

By M. W. Bourdon

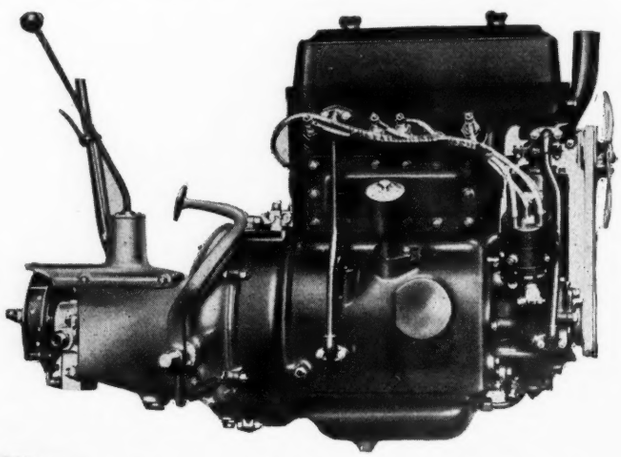
W. R. MORRIS has announced a new model corresponding as to engine size and price with the Austin Seven, though with accommodation for four adults as distinct from two adults and two children.

The engine is a four cylinder with overhead camshaft driven by a bevel-gear-operated vertical shaft that also forms the generator shaft; bore and stroke are 57 by 83 mm. (847 cc.). Battery ignition is used, with full pressure lubrication and gravity feed to the S. U. carburetor. The crankshaft has two bearings. Pistons are aluminum and connecting rods duralumin.

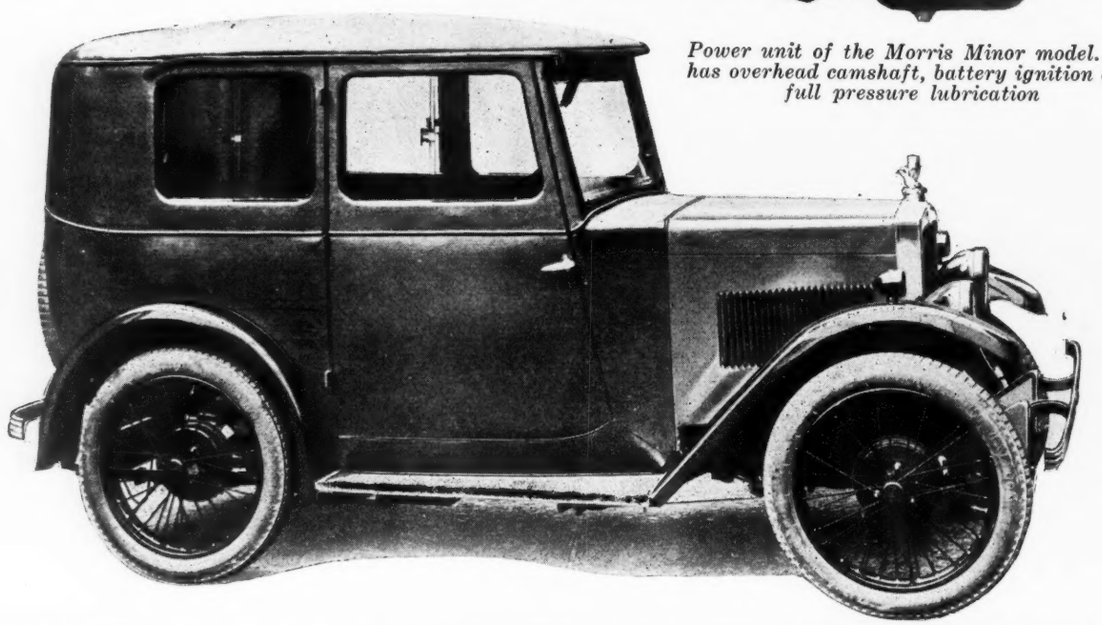
The three-speed unit powerplant with three-point suspension—two points on rubber cones—includes a single-plate clutch and a hand-operated parking brake at the rear of the gearset. Final drive is by spiral bevel with open propeller shaft. Semi-elliptic springs are used with shock absorbers. The four-wheel brakes have cable operation. Tires are 26 by 3.5 in. on detachable wire wheels. The wheelbase is 78 in. and the track 42 in. Equipment includes five lamps, bumpers, spare wheel and tire, automatic screen wiper, rear view mirror and other normal accessories.

Two types of four-passenger bodies are offered, a two-door fabric sedan and an open model with folding top and rigid side screens. The body of the sedan is 40½ in. wide inside, width of rear cushion is 33½ in. plus elbow room over the wheel arches, while each front seat (adjustable and folding) is 17 in. wide. From cushions to roof interior is 36 in. Foot wells at the rear enable the seats to be close-coupled with ample leg reach. Upholstery is in leather cloth.

In its exterior outlines the sedan accords with the prevailing design tendencies for fabric bodies; the roof



Power unit of the Morris Minor model. It has overhead camshaft, battery ignition and full pressure lubrication



The Morris Minor 8 hp., four-passenger sedan which is priced at £135 and is claimed to have a speed of 55 m.p.h.

is domed, the rear quarters and back are well curved, the windows (two on each side) are proportionate to the body dimensions, with a fair depth though affording a moderately high belt-line, with a narrow beading 4 in. below and continuing all around. At the rear is a window of large size. The side windows are in half panes, sliding to open. Two colors are offered, dark blue and brown. A single panel adjustable screen hinged at the top is fitted, with a slight slope, the same slope determining the angle of the front edge of the doors, which are 27 in. wide at mid-height. Radiator and hood follow recent Morris lines, with a winged heat indicator.

The prices of this new model, which is said to be capable of 55 m.p.h. and to have a fuel consumption of 50 m.p.g. are: Open car £125, sedan £135, precisely the same as the figures applying to the Austin Seven.

As regards the continued models of the Morris range, prices have been slightly increased in the case of the "Cowley" (11.9 hp.) models, while those of the "Oxford" (14 hp.) have been reduced. These four-cylinder cars are unchanged in the fundamental features of design but a notable variation is the lowering of the frame height by nearly 4 in., which greatly enhances the appearance of the finished cars and, of course, increases their stability.

Other modifications are new body designs for the sedans, with duotone cellulose finish in a choice of three shades, improved springing and one-piece dome fenders. The Cowley models now have dipping headlights as well as the Oxford, and like all Morris cars for 1929 have bumpers fore and aft, while Triplex glass is offered as an extra. A fabric sedan has been added to the range of Oxford bodywork; it is a four-door, four-light type with winding windows at the rear and sliding in front and "period" interior furniture.

The largest four, the 16-40 hp. (80 by 125 mm.) is, like the others, unchanged in the chassis, apart from minor details; an additional body here is also a fabric sedan.

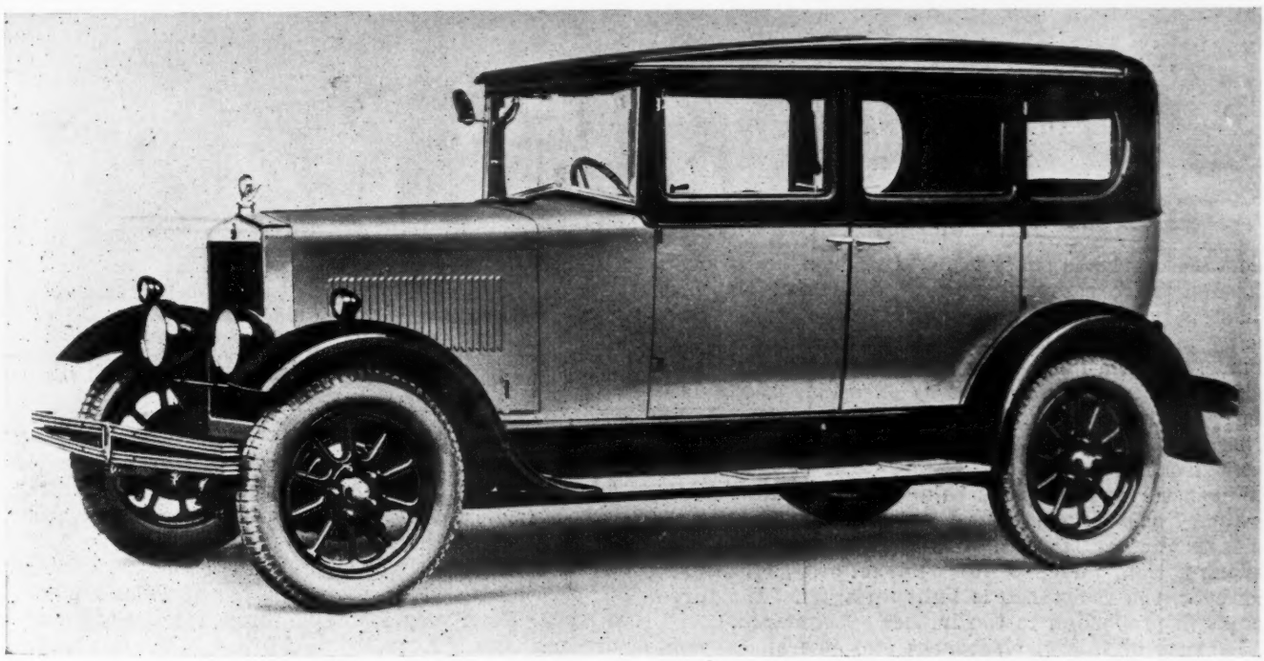
No change occurs in the chassis of the Morris Six, the 2½ liter model introduced at the last Olympia show; the price is reduced by £20 despite the addition of bumpers and an automatic stoplight.

Morris announces that new arrangements for time payment for all models have been made, whereby any reasonable down payment will be accepted.

The following are the various Morris models and prices for 1929, with 1928 prices and the extra charges for Triplex glass:

	Prices 1929	Triplex Glass Extra	Prices 1928
8-hp. "Minor"			
Open	£125	£2	....
Sedan	£135	£6. 10s.	....
11.9-hp. "Cowdrey"			
Two-seater	£160	£2. 10s.	£152
Four-seater open	£175	£2. 10s.	£170
Coupe	£180	£5	£175
Sedan	£190	£7. 10s.	£185
14-28-hp. "Oxford"			
Four-seater open	£215	£5	£225
Coupe	£225	£10	£230
Sedan	£240	£12. 10s.	£250
Sedan de luxe	£265	£12. 10s.	....
Fabric sedan	£255	£10	....
16-40-hp. "Oxford"			
Five-seated open	£295	£5	£315
Sedan	£310	£15	£345
Fabric sedan	£320	£10	....
17.7-hp. Six-cylinder			
Coupe	£365	£12. 10s.	£385
Sedan	£375	£15	£395

AMONG the changes in a new 1½-ton truck chassis brought out by Morris Commercial Cars of England may be noted the elimination of front wheel brakes with vacuum servo and the enlargement of the double rear wheel brakes; the substitution of a three-speed for a four-speed gearset and of a single for a two-part propeller shaft, the chassis now being made in only a single wheelbase length (132 in.).



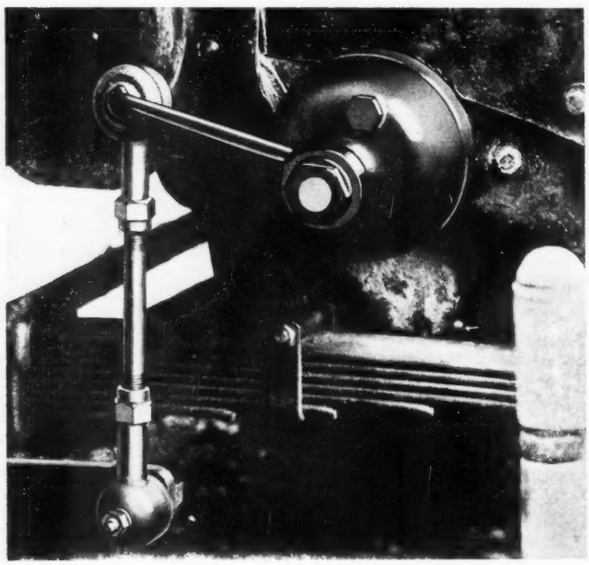
With improved lines, the addition of bumpers and other items of equipment, and with a choice of five color schemes, the 1929 Morris Six has been reduced from £395 to £375

"Triple-Hydraulic" Shock Absorber Introduced by Gabriel

New device is of double-acting type, controlling both up and down spring movement. Feature is patented multiple vane which distributes shocks through three points.

THE Gabriel Snubber Co., Cleveland, Ohio, has entered the hydraulic shock absorber field with a new type of device designated the Gabriel Triple-Hydraulic. It is of the double-acting type, controlling both upward and downward spring thrusts. Adjustments can be made to suit individual requirements as to the kind of ride desired by the owner, weight of car or condition of the road.

The feature of the new device is a patented multiple vane or paddle shaft which distributes each shock through three separate points. This multiple vane shaft is inserted in a cylindrical case, the former being attached to the axle and the case to the car frame. Within the case is a segment with a movable adjusting screw which controls an orifice to regulate the pressure available for control of spring recoil. There also is a fixed orifice which cushions the impact stroke of the spring.



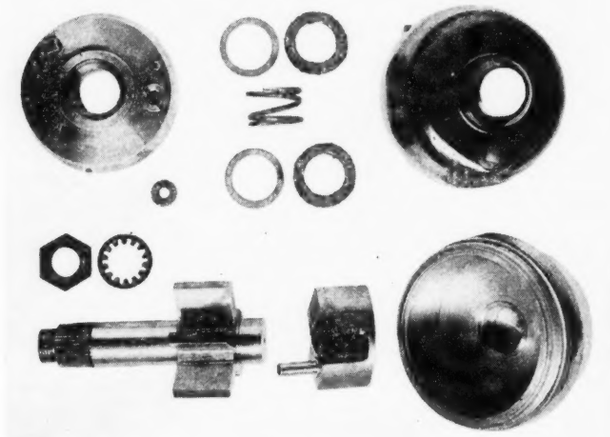
Gabriel Triple-Hydraulic shock absorber installed on car

When the vane shaft is being actuated slowly over ordinary smooth roads very little pressure or resistance is created, thus interfering little with normal spring action. When a quick impact or recoil occurs, however, the resistance is built up against the three vanes in proportion to the impact encountered.

Because of liberal clearances and tolerances, temperature changes have no effect upon the action. Excessive wear and noise have been eliminated by forging ball joints upon the shock absorber arm and axle bracket. These are inserted in a stamped receptacle which carries a rubber cup inside of which is a graphite bronze bushing in direct contact with the ball. The ball is thus insulated by the rubber cup but the bronze bushing makes it self-lubricating and noiseless.

The arm proper is broached and the vane shaft serrated so that the arm may be drawn tightly on the vane shaft. The vane shaft has a travel of 150 deg. so that placement of the arm is not a delicate operation.

In general, the new device has been designed to give a floating movement to the car through a soft cushioning action and the dampening action on the impact stroke is so soft and controllable that there is no rigidity or chatter at any car speed.



Details of the new Gabriel shock absorber, showing the reservoir assembly with the multiple vane shaft and segment containing the fixed orifice, and the reservoir cap assembly with the compression spring and the double tapered packing glands that seal the liquid in the chamber

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ACCORDING to German sources, representatives of the Soviet Government are at present negotiating with several French manufacturers with a view to their participation in the development of the Russian automobile industry. The Renault firm is being prominently mentioned in this connection, and the Russians are said to have offered very favorable terms for the manufacture in Russia if Renault would invest 25,000,000 francs in an automobile manufacturing enterprise in that country. In this connection it is pointed out that similar negotiations with Ford came to naught.

Just Among Ourselves

Distributors and Their Future

D. G. BAIRD, writing in the August issue of Sales Management & Advertisers' Weekly, quotes anonymously a number of automotive executives as considering distributors not only useless in the marketing of low-priced and middle-priced car lines, but also as being generally a shiftless and uneconomic lot. "Our distributors do practically nothing," one executive is quoted as saying, "to earn their discounts. They just sit back and take their rake-off for okaying dealers' orders." An executive of another company which is dropping distributors and increasing its own field organization says: "There will no longer be any question as to whether the distributor or the dealer is to blame for not hitting the ball; if anybody is to blame it will be the dealer. We can make the dealer do as we say because if he doesn't we can easily get another in his place." Maybe these expressions are characteristic of the attitude of a number of factory sales executives, but we can't believe that they are. Certainly they don't sound typical of the attitude toward distributors and dealers which we find in our own travels through the industry.

* * *

Costs Are There Just the Same

WHILE it is true that direct dealerships have been proved to be the most economic way of marketing quantity production lines, and while it is equally true that there have been and still are inefficient and lazy distributors handling some cars in some territories, there can be no question about the continued presence of numerous distributors who are doing a fine job of merchandising and without whose support particular factories would be in dire straits. It is strange too at this stage of the game to see still stalking about the ancient myth that by eliminating a distributor or a branch, the discount previously allowed is saved to the manufacturer. The distributor or the branch performs a very definite marketing and distributing function. For some types of cars a field force dealing direct with dealers may perform that function more efficiently; but the cost of performing the function, while perhaps lessened, certainly is not eliminated.

* * *

Good Dealers Not so Easy to Replace

MOREOVER, the factory today which, when a dealer isn't quite satisfactory, "can easily get another in his place," unquestionably is the exception rather than the rule. Nobody can talk intimately and frankly with factory sales executives, with factory field men and road men and come away with the feeling that good dealers are easy to get and hold. Nor are most factory men today thinking and talking with the idea that the factory is always right and the dealer is always wrong. Some of that attitude still exists, to be sure, but it is definitely on the way out as a permanent, successful operating policy. It would be easy to compile from conversations with distributors and dealers in recent months a series of charges about factory merchandising and operating inefficiencies just as strong as any arraignment of distributors and dealers based on statements of some factory men. But there would be no point in so doing. The problem always has been and remains today one of mutual adjustment day in and day out in small things as well as large between factories and wholesale and retail organizations; and, at the same time, adjustment of both factors to constantly changing marketing and economic conditions. Changes in systems alone are not nearly so important as adaptation of any system to the practical conditions of operation. That vital truth is pretty well recognized among successful automotive sales executives today and is forming the basis for most of the constructive thinking about passenger car selling that is being carried forward. . . . At least, that's the way the situation appears to us; we would be more than glad to hear from any factory executives—personally or for publication—who feel inclined to agree or disagree.

* * *

Automotive Prosperity Well Diffused

THE spreading of this year's automotive prosperity through a large part of the parts and accessory as well as through the complete vehicle manufacturers is a particularly encouraging part of the fall outlook. Out of 17 parts and accessory organizations reporting, 14 have showed larger earnings for the first half of this year than they did in the first half of 1927. Aggregate net income for these 17 representative companies, according to Standard Statistics, for the first half of 1928 was $27,028,000 as against $21,614,000 in the first half of 1927, a gain of 25.5 per cent.—N. G. S.

First with the News

Reliable and Accurate

News of the Industry

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Record 4th Quarter Assures High Year

Adair Tells M. & A. M. A. Credit Meeting Signs Point to New High Totals

BUFFALO, Sept. 13 — Prosperity seems likely to continue for some time the members of the Motor & Accessory Manufacturers Association were told at the annual credit conference held in the Hotel Statler here today. Business in this country and abroad is on a sound basis and the automotive industry in particular is experiencing its greatest year in volume, and a much better year than 1927 in profits. Consolidation of manufacturing companies, when properly planned, have resulted in benefit to the industry.

General business was reassuringly outlined by Samuel B. Botsford, general manager of the Buffalo Automobile Chamber of Commerce. Effect of mergers was discussed by C. S. Davis, treasurer of the Warner Gear Co., who talked on "Mergers and the Public Good." Particular business conditions as applied to the automotive parts and accessory business were outlined by Neal G. Adair, manager of the sales development department of the M. & A.M.A., in an illustrated talk showing the recent progress, present condition and immediate outlook of the industry and emphasizing the fact that increased volume supported by production economies and progressive management have enabled a substantial number of manufacturers to increase their net profits this year. Mr. Adair's speech contained the following points:

Good Business in 1929

That the industry will have a record fourth quarter, concluding a record year in production and distribution.

That, barring unforeseen developments in this country and abroad, another year of exceptionally good business may be looked for in 1929.

That the condition of the automobile dealer trade, while unsatisfactory in many respects, is generally no worse than it has been in the past year or two and in some respects is better.

That instalment selling, which has been largely responsible for the rapid

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First Bus Arrives on Coast Service

NEW YORK, Sept. 12 — Transcontinental bus service on a regular schedule was inaugurated by the arrival yesterday of the first Yelloway bus at the Capitol Bus Terminal in this city, bringing passengers from Los Angeles. These buses, which will carry 26 passengers, hereafter will leave on a regular schedule starting from the Capitol Terminal in New York at 2 p. m. and 1 a. m.

1928 Production Within Half-Week of 1926 Total

PHILADELPHIA, Sept. 15—Preliminary figures of an August production of 485,000 cars and trucks carry with them the virtual certainty that the automotive industry will set up a new production record in 1928. To do this it must exceed the 4,503,531 total set up in 1926. With the August output the present year is about 72,000, less than one week's output, behind production in the first eight months of 1926.

Output in the last quarter of 1926 slowed down sharply after high operations through the early year, culminating with a 410,000 output in September, that year. Operations in the present September promise to at least approximate the September, 1926, figure, with distinct likelihood that the last quarter this year will considerably exceed the last quarter of 1926.

Reports from leading centers indicate that cars are moving into the hands of retail purchasers at a rate closely approximating factory production.

Sparks Earns $1,212,605

JACKSON, Sept. 13—Sparks-Withington Co. reports net earnings for the year ended June 30 of $1,212,605, after Federal taxes and charges. Balance sheet as of June 30 shows total assets of $4,251,068, current assets of $2,385,092, current liabilities of $523,601, and profit and loss surplus of $1,222,218.

Mullins Mfg. Co. reports August earnings of $100,640.

Larger Car Spaces at Shows in 1929

Salon for Higher Priced Cars and Foreign Cars to be New York Feature

NEW YORK, Sept. 13—Plans for the 1929 national automobile shows in New York and Chicago, including striking innovations that will appeal to the trade and the public, are beginning to materialize. Car spaces will be larger, decorations will outshine previous expositions, the second floor of the New York show will be reserved as a salon for the higher priced cars, and foreign automobiles will be exhibited for the first time.

Announcements just sent out regarding the shows by the National Automobile Chamber of Commerce and the Motor & Accessory Manufacturers Association to their members show that successful features of former shows will be retained, including the special sections for shop equipment, closed to the public until evening, and with jobbers cooperating with manufacturers.

The N.A.C.C. will assign car exhibit spaces early in October and the M. & A.M.A. will allot its sections immediately thereafter.

Early responses from members of the M. & A.M.A. indicate an unusually strong interest on the part of manufacturers of some of the more important original equipment units, the service, parts, accessories and shop equipment. The shop equipment sections will be located, as in the past two years, on the fourth floor of Grand Central Palace in New York and the north gallery of the Coliseum in Chicago.

Fisher on Big 4 Board

NEW YORK, Sept. 13—Fred J. Fisher has been elected to the board of the Cleveland, Cincinnati, Chicago & St. Louis Railway, the most important subsidiary of the New York Central, succeeding the late Chauncey M. Depew. Either Mr. Fisher or one of his brothers will be elected to the directorate of the controlling company at a directors' meeting Oct. 10. Stock in the New York Central has been acquired by the Fisher interests in the open market.

Committee to Draw U.S. Truck Standard

Simplification of Government Purchases to Result From N.A.C.C. Proposal

WASHINGTON, Sept. 13—Initial steps to form a set of standard specifications for the purchase of trucks by the Federal Government were taken here this week by a special sub-committee of the motor truck committee of the National Automobile Chamber of Commerce. The primary purpose of the conference is to work out with the Federal specification board standard truck specifications which will simplify the submitting of bids by truck manufacturers bidding for the Federal business.

The members of the sub-committee who met in Washington are: David C. Fenner, of the Mack Truck Co.; C. F. Maggoffin, Reo Motor Truck Co., and John Sterrett of General Motors Truck Corp. Under the procedure, the sub-committee will tentatively submit standard specifications to the truck committee of the National Automobile Chamber of Commerce. It is expected that these specifications will be submitted at the next meeting of the chamber the first week in October, in New York City.

The work of standardization of specifications for the Federal government was initiated by the War Department because of the wide variety of bids submitted on trucks for governmental use. Latest census of governmental trucks show that 8023 are in use by the War Department, 6800 by the Post Office Department, and an estimated 4000 by other departments.

It is the expectation of the committee that the standards adopted by the Federal government will eventually be followed by state, city and municipal purchasers of trucks and for this reason it has been announced that great care is being used in the drafting of the specifications.

Franklin Elects Williams

SYRACUSE, Sept. 14—John E. Williams has been elected vice-president in charge of all sales activities of Franklin Automobile Co. He has been connected with the company for a year and one-half as merchandising and advertising counsel.

Briggs Acquires Plant

KNOXVILLE, TENN., Sept. 12—Briggs Mfg. Co. has taken over the Oliver plant here which it will remodel for the production of automobile and body wood parts.

Tool Demand Near Boom

CINCINNATI, Sept. 10—The monthly review of trade conditions by the National Machine Tool Builders' Association says demand is taking on boom proportions. The August sales figure is reported as the highest for any single month since the post-war boom. Present orders are mainly from the domestic field, as against the post-war business which included a large volume of foreign buying. The association reports prices for material stiffening as result of increased demand.

Continental Forms Aeronautic Division

DETROIT, Sept. 13—Continental Motors Corp. is actively entering the field of aviation it was revealed this week by W. R. Angell, executive vice-president, who announced the establishment of an aeronautical division to be headed by Robert Insley who has resigned as assistant chief of the powerplant branch of McCook Field.

Mr. Angell said plans are now being drawn for three popular sized radial engines, a five-cylinder, a seven and a nine. Research work will be conducted on other types and sizes. Plans call for active production in 1929, the first engine to be built probably being the seven developing 125 hp., Mr. Insley said.

Oakland to Install New Flash Welding Equipment

DETROIT, Sept. 11—With completion of the removal of the sheet metal department devoted to production on the Oakland line to the new Oakland plant, the entire space at the former plant will be made available for increasing the capacity of the axle housing division.

This expansion will be made use of to produce housings for the Pontiac line which were formerly bought from another General Motors subsidiary. The latest type of flash welding equipment will be installed to handle the Pontiac housings. These machines are nearly entirely automatic in operation and make it possible for 200 axle housings to be turned out per hour, per man.

Coast Durant Net $213,742

SAN FRANCISCO, Sept. 10—Durant Motor Co. of California earned net, after all deductions, $213,742 during the first six months of 1928, greater than for any similar period in its history, it is announced by Norman DeVaux, vice-president and general manager. Production was low in January and February, due to shortage of material, and demand now is pressing the factory to its capacity.

August Rim Output Gains

CLEVELAND, Sept. 13—Rim production in August total 2,318,898 as against 1,825,905 in August last year, according to the monthly report of the Tire & Rim Association of America, Inc. The eight months' total is 17,502,629 as against 14,926,999 in the 1927 period. The largest increase for the month was on the 19-in. balloons.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, Sept. 13—The opening of schools throughout the United States and cold weather in the past week have stimulated retail trade, especially in the drygoods line. All prospects promise good crops of grain and cotton, and the buying power of the agricultural communities should be considerably enhanced.

CHAIN STORE SALES

Sales of 28 chain-store systems in August showed an increase of 16.9 per cent over August, 1927. The total sales of these same reporting chain stores for the first 8 months of this year increased 17.5 per cent over the corresponding period last year. The most potent factor contributing to these increases was the continual opening of new stores and the acquisition of smaller chain stores by some of the 28 reporting companies.

FREIGHT CAR LOADINGS

Car loadings for the week ended Aug. 25 totaled 1,080,840 cars. Although this is an increase of 23,935 cars above the preceding week, it is nevertheless a decrease of 28,501 cars below the corresponding week last year. The total loadings for the four weeks in August were 287,878 cars above July, and only 19,037 cars below August, 1927.

PETROLEUM OUTPUT

The daily average production of crude oil was 2,503,250 bbl. for the week ended Sept. 1, which is the first time in about 10 months that the daily average production topped the 2,500,000 mark. Increasing production persists, notwithstanding the various efforts to effect stabilization through regulated production.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Sept. 8 was 99.7, as compared with 100 the previous week.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Sept. 5 were 9 per cent above the corresponding period last year.

FEDERAL RESERVE REPORT

One of the most striking changes in the credit situation in some time was effected when the rate on time money rose to 7 per cent on Sept. 10, the highest figure it has reached in eight years. In keeping with this, the combined statement of the Federal Reserve banks for the week ended Sept. 5 showed an increase in discounted bills of $41,300,000, while there was an increase in the New York district alone of $57,700,000. An increase in bills bought in the open market and a decrease in holdings of Government securities practically offset one another.

Continental Motors Gets New Contracts

Orders Include 5000 "Eights" for Company Formerly Making Own Engine

DETROIT, Sept. 8 — Continental Motors Corp. will enjoy a big growth in the volume of business during the next few months due to orders of generous porportions from several new customers and larger demands from old customers, according to W. F. Angell, executive vice-president. He reports that an increase in orders will react favorably in Continental production during the balance of the year in both the automotive and industrial divisions.

"One of the new orders calls for 5000 engines for a well-known eight-cylinder car, engines which up to this time have been produced in the buyer's own plant. Production of these engines will start immediately; delivery to begin Oct. 1. Other orders placed with our industrial division by some of the country's leading agricultural implement houses call for immediate production of between 20,000 and 30,000 heavy-duty engines.

"Two of our larger regular customers have substantially increased their schedules for delivery during the next 90 days covering engines now in production. These increased schedules together with the new automotive and industrial business recently placed with us assures a larger production than usual during the remainder of the year."

Nash Sets New Record with 22,525 August Sales

KENOSHA, Sept. 8—In August a total of 22,525 new "400's" were shipped by Nash Motors Co. This August shipping record exceeded by 4000 cars the biggest month in Nash annals and was still 11.858 cars below the actual orders on file for August delivery.

September has opened for Nash with orders on file that will far exceed the number of cars that the three Nash factories can produce, in spite of the fact that quantity production schedules have reached a new record peak of more than 1000 cars daily. The Warren-Nash Motor Corp., New York, heads the September order list with 4545. Nash registrations in Chicago in July totaled 10,884.

Locomobile Lowers Prices

NEW YORK, Sept. 10—Locomobile Co. of America, Inc., has made price reductions of $105 on its 8-70 models and of $200 on six models in its 8-80 line. Each of the three models in the 8-70 line are now priced at $1,995. In the 8-80 line the new and old prices follow:

	New	Old
4-p. sport tour.	$3,100	$3,300
4-p. coupe Victoria	2,775	2,975
5-p. sedan	2,650	2,850
5-p. brougham	2,700	2,900
7-p. sedan	3,150	3,350
7-p. sub. sedan	3,300	3,500

M.A.M.A. and A.E.A. Advance Merger Plan

NEW YORK, Sept. 8—A two-day session of the committees of the Motor & Accessory Manufacturers Association and the Automotive Equipment Association to arrange the final details for the merger of these two associations was held at the Hotel Biltmore this week. Considerable progress was made at these meetings toward the consummation of the merger. No date has been decided for subsequent meetings which will have to take place before the deal can be finally put through.

Vanadium Alloy Proposes Colonial Steel Purchase

PITTSBURGH, Sept. 8—At a recent meeting of the board of directors of the Vanadium-Alloys Steel Co., Latrobe, a proposal which later received favorable consideration was made to the directors of the Colonial Steel Co., Pittsburgh, whereby shares of stock of the Colonial company are to be exchanged for shares of stock of the Vanadium company. A meeting of the stockholders of the Vanadium company has been called for Oct. 30, to approve the action of the directors.

No changes in the management of Colonial Steel are contemplated for the present, except that the sales of the products of the two companies will be coordinated. George P. Rhodes, T. Howe Childs, and S. Clarke Reed, will be the representatives of the Colonial company on the board of directors of Vanadium-Alloys Steel Co.

Zenith Introduces "110"

DETROIT, Sept. 8—Zenith-Detroit Corp. has introduced its new "110" series carburetor. It is claimed the new device offers unusual acceleration, speed and economy features as well as providing an especially low idling range and easy starting. Replacement units are now ready for the following cars: Chevrolet, Pontiac, Dodge, Essex, Oldsmobile, Whippet, Buick, Studebaker, Chrysler and Graham-Paige.

Motor Wheel Gains 65%

NEW YORK, Sept. 8—Motor Wheel Corp. reports sales during August as 65 per cent ahead of August, 1927. Net earnings for the first eight months of this year are estimated at $2,000,000 which will exceed by $450,000 earnings for the entire year of 1927.

Lapeer Buys Wolverine Assets

LAPEER, MICH., Sept. 10—Lapeer Trailer Corp. has purchased from the Guaranty Trust Co., Detroit, receivers, the assets of the Wolverine Trailer Co. of Detroit.

Curtiss Organizes New Flying Service

Will Operate Air Taxis in Group of Cities and Serve as Sales Agent

NEW YORK, Sept. 8—All taxi service between various cities is to be inaugurated by next spring, according to plans announced yesterday by the Curtiss Flying Service, Inc. The planes will be available at various airports to transport passengers from one state to another upon call. This Curtiss Flying Service, Inc., is a new corporation which will replace the present flying service operated at Curtiss Field.

The corporation will also maintain flying schools at various points throughout the country, will act as sales agent for the Curtiss Aeroplane & Motor Co., Inc., and, according to preliminary plans, will establish three so-called air universities for advanced training of pilots.

Casey Jones, vice-president of the Curtiss company, will be president of the new corporation and will be backed by C. M. Keys, president of the Curtiss company, and by certain banking interests which have been allied with Mr. Keys for some time.

LeBlond-Schacht Buys Armleder Motor Truck

CINCINNATI, Sept. 8—Acquisition of the O. Armleder Motor Truck Co. by the LeBlond-Schacht Truck Co. has been announced by the latter company. Manufacture of Armleder trucks will be continued by a new corporation to be formed and operated as a division of the LeBlond-Schacht Company at its Cincinnati plant. Service and parts for all Armleder trucks now in use will be available from the same point. With the exception of Otto Armleder, retired, the entire Armleder personnel will be retained. By reason of the consolidation the LeBlond-Schacht line will consist of light and heavy duty vehicles in various price classes ranging from 1½ to 7½ tons.

U. S. Compressor Builds

CLEVELAND, Sept. 10—Production facilities of the United States Air Compressor Co. here have been increased by the completion of a large plant addition. This building adds 21,000 sq. ft. to the factory space and more than 1000 sq. ft. to the offices and exhibit room. These additions will increase production approximately 33 1/3 per cent.

Oakland August Sale 23,823

PONTIAC, Sept. 10—Sales to dealers by Oakland Motor Car Co. in August totaled 23,823 as against 13,544 in August, 1927. Sales to dealers in the first eight months increased to 206,766 as against 126,126 in the same period last year.

Sales in 17 Cities Gain 38% in July

Seven Months' Sales Increase 11 Per Cent in 15 Cities—Two Show Drop

PHILADELPHIA, Sept. 8—Further evidence of greatly increased activities in automotive markets this year as compared with last year is found in new car sales reports from 17 representative cities, in every one of which July sales this year were substantially greater than during July, 1927.

The cities included in this survey range in size from Akron, with 208,000 inhabitants, to Chicago with 2,995,000, and are geographically scattered from Los Angeles in the West to Philadelphia in the East and from Dallas in the South to Detroit in the North.

In each of these cities considerably more new cars were sold during July than during the same month in 1927. The average increase in all the cities was 38 per cent more than the 1927 figure while individual increases ranged from 14 per cent in Philadelphia to 42 per cent in Detroit.

That this record is not occasioned by a sudden burst of activity during a single month but has been more or less maintained throughout the year is shown by the fact that in all but two of the 17 cities total sales for the first seven months of the year have been greater by over 11 per cent on the average than during the same period of 1927.

In the two cities where decreases have been registered from the 1927 totals the percentage decreases were only 3 and 1 per cent respectively.

Over 15,000 more cars were sold in these cities last July than during July, 1927, while for the seven months total an actual sales gain of nearly 34,000 units has been made.

Detroit Registers 8290

DETROIT, Sept. 8—New passenger car registrations in Wayne County for August totaled 8290 units. This brings the registrations for the first eight months to 60,296 compared with 41,906 last year.

For the first time in many months Ford delivered more cars than Chevrolet. Ford passenger cars totaled 1294 compared with Chevrolet's 1051. Next in line came Essex with 925 cars followed by Buick with 893. Chrysler delivered 512, Plymouth 503, Pontiac 430 and Graham-Paige 439.

A total of 437 commercial cars were delivered during August, bringing deliveries in this division for the first 8 months to 3760 compared with 3843 in the corresponding period last year. Chevrolet led with 168 units, followed by Ford with 150, Graham Brothers 28, G.M.C. 22, and Reo 19. Three tractors were sold during the month and 13 buses.

Bay State Registry Shows 45,627 Increase

BOSTON, Sept. 10—Registrations in Massachusetts up to Aug. 1 show an increase of 44,094 cars and 1533 trucks over registrations in 1927 to the same date. July showed an increase of 6340 cars and 482 trucks. The total car registration to Aug. 1 was 685,628 against 641,534 in 1927, and truck registration was 89,421 against 87,888.

Louisville August Sales Show 54.7 Per Cent Gain

LOUISVILLE, Sept. 10—Louisville new car sales for the eight months of the year total 6788, as against 5121 in the same period last year, a gain for the eight months of 32.5 per cent. August continued the increase which has been noted for every month of this year, with 964 cars, as against 623 last year in August, or a gain of 54.7 per cent.

A feature of August sales in Louisville were shown in Ford sales, which advanced to 225 cars and 34 trucks. Chevrolet sold 243 cars and 18 trucks. In addition to passenger cars there were 91 trucks sold in August, including 18 Chevrolet; 1 Rugby; 34 Ford; 8 G.M.C.; 5 Graham; 11 Indiana; 4 International; 2 Mack; 4 Schacht, and 4 White.

Studebaker Shows Gains in 12 Consecutive Months

SOUTH BEND, Sept. 10—A 12-month period in which each month showed an increase in sales over the corresponding month of the previous year has just been completed by the Studebaker Corp. of America, Inc. Retail deliveries by dealers during August were 19 per cent greater than in August, 1927. Since the introduction of the new Studebaker line of cars early in July, production has been unable to keep pace with demand. Orders for certain models are now so great that it will be 30 days before factory schedules can be stepped up to fill them.

Accuralite Plant Ready

MUSKEGON, MICH., Sept. 10—Accuralite Co. has completed its new $50,000 factory here which will be used exclusively for the manufacture of cast iron and Lynite pistons. The company will offer a complete piston service for all types of internal combustion engines.

Resume Tire Price Levels

NEW YORK, Sept. 8—Price reductions of 20 per cent recently made in second grade tires by Goodyear Tire & Rubber Co., U. S. Rubber Co. and Firestone Tire & Rubber Co. have been discontinued. Prices on these are again at former levels.

Eight Ohio Centers Show August Gains

Business in Practically Every Section Exceeds July—Ford Shows Increase

COLUMBUS, Sept. 10—The Ohio Council, National Automobile Dealers Association, in its compilation of sales records in eight of the most populous counties of Ohio during August, indicates that business in practically every section of the state is ahead of that of July. The figures also show that Ford sales are coming back and are now practically even with those of Chevrolet.

Cuyahoga county, containing Cleveland, had 4171 new car sales in August, compared with 3998 in July; Hamilton county, containing Cincinnati, had 1748 compared with 1659; Summit county, containing Akron, had 1260 sales, compared with 1246; Franklin county, containing Columbus, had 1266, compared with 1267; Mahoning county, containing Youngstown, had 761 sales, compared with 687; Stark county, containing Canton, had 819, compared with 799; Scioto county, containing Portsmouth, had 242 sales, compared with 219, and Montgomery county, containing Dayton, had 871, compared with 877.

Sales of Fords in the eight counties in August totaled 1874 while Chevrolet sales were 1896.

North Carolina Business Shows August Increase

RALEIGH, N. C., Sept. 8—Sales of new automobiles in North Carolina in August numbered 7210, according to report from the state department of revenue which handles automobile licenses. This is an increase of 260 over July when 6950 cars were sold. The significant feature of the August sales was that for the first time in many months Ford cars topped the list, taking the lead away from the Chevrolet. Ford sales numbered 1966 and Chevrolets 1681.

Tabulations for other cars were not complete at the time of this tabulation, but it was indicated that good gains were made in most of the makes of cars.

If new car sales keep up for the remaining months of the year as they have for the past months, this will be a banner year in North Carolina for automobile dealers, according to Sprague Silver, chief of the license bureau.

Ohio Employment Gains

COLUMBUS, Sept. 8—The bureau of business research of Ohio State University, in a preliminary bulletin shows employment in automotive and parts plants in August was 4 per cent greater than in July and 16 per cent greater than in August, 1927. Of the 42 reporting concerns, 21 showed increases of August employment over July, 19 showed decreases and two showed no change.

Men of the Industry and What They Are Doing

Battery Manufacturers Arrange Meeting Papers

A uniform cost accounting system, standardization and the future of the battery industry are to be the outstanding subjects discussed at the annual convention of the National Battery Manufacturers Association at Atlantic City, Sept. 20 and 21, according to the tentative program just announced.

Papers on technical subjects as well as general subjects are included in this program. J. B. Perlman of the Hartford Battery Mfg. Co. will speak on What of the Future of the Battery Industry? A. F. Strayer, treasurer of the USL Battery Corp., will present a suggested Uniform Cost Accounting System. Export conditions in general will be presented by E. L. Bacher of the U. S. Chamber of Commerce. Some Significant Trends in the Automobile Industry is the subject which will be discussed by G. M. Graham, vice-president of the Willys-Overland Co. Standardization will be discussed by Dr. G. W. Vinal, physicist of the Department of Commerce.

There will also be a special feature consisting of the film, Life in the Jungles, shown by the Rakuda Wood Products Co. of Pittsburgh.

Join Kearney & Trecker

August Wilks has been appointed works manager of Kearney & Trecker Corp., Milwaukee. For the past five years Mr. Wilks has been the production manager of the Hoover Vacuum Sweeper Co., Canton, Ohio. C. M. Cheadle, Jr., has been engaged as advertising manager. Mr. Cheadle was formerly advertising manager of the Barber-Coleman Co., at Rockford, Ill., and more recently associated with the Geo. F. McKiernan Advertising Agency of that city.

Autocar Promotes Custer

C. R. C. Custer has been elected assistant secretary and assistant treasurer of the Autocar Co. He has been a member of the Autocar organization for the past 10 years, serving as auditor and recently as traveling factory representative.

Land Joins Guggenheim

Capt. E. S. Land, assistant chief of the bureau of aeronautics, Navy Department, has been granted a leave of absence to become vice-president and treasurer of the Daniel Guggenheim Fund for Promotion of Aeronautics.

Graham Dinner Speaker

George M. Graham, vice-president of the Willys-Overland Co., has been selected as dinner speaker at the annual meeting of the Ohio Council of the National Automobile Dealers Association, Sept. 13, in Cincinnati.

C. E. Eldridge

New general sales manager of Reo Motor Car Co.

Moore Joins Engine Company

Robert S. Moore, associated with Emile Berliner in the marketing of the Gyro engine, America's first rotating airplane engine, consulting engineer and chief of inspection on Rhone production during the war and with the supply division of the air corps during post-war years, has left the aeronautics branch of the Department of Commerce to again engage in engine manufacturing. He will join the F. Wesel Mfg. Co., Scranton, Pa. A five-cylinder radial engine of 125 hp. will be marketed under his supervision early next year.

Briggs Sales Manager

W. A. Briggs, for many years in charge of the service department of the Boston Woven Hose & Rubber Co., has been appointed sales manager. R. J. Owens has been appointed merchandise manager and H. F. Maxon becomes district field manager in charge of the territory including New York, Pennsylvania, New Jersey, Delaware and Maryland.

Nash on European Trip

C. W. Nash, president of Nash Motors Co., sailed Sept. 8 on the Swedish American motorship Gripsholm for Gothenburg, whence he will go to visit the Paris and London shows. Mr. Nash was accompanied by Mrs. Nash.

Durham Heads Flint Chamber

Cady B. Durham, vice-president and assistant general manager of the Buick Motor Co., has been elected president of the Flint Chamber of Commerce.

World Highway Leaders Coming to U. S. in 1930

Leading highway officials from all parts of the world are coming to the United States in 1930 to study American methods of road improvement and road use, according to word brought back from the recent sessions of the International Road Commission at Paris, by Thomas H. MacDonald, chief of the United States Bureau of Public Roads and chairman of the Highway Education Board.

Mr. MacDonald went to France as head of the official delegation representing the American government at the road meeting. He later made an investigation into phases of highway development in many of the countries of Western Europe and in the British Isles.

Aside from Mr. MacDonald, members of the United States delegation to the International Commission were H. H. Rice, treasurer of the National Automobile Chamber of Commerce, Pyke Johnson, executive director of the Highway Education Board, and H. H. Kelly, commercial attache, representing the Department of Commerce.

An American committee will be named soon to take charge of the work of preparation for the congress.

Executives to Visit Shows

Among American automobile executives who are sailing to attend the automobile salons in Paris and London are John N. Willys, president, Willys-Overland Co., who sails on the Aquitania, Sept. 12; Paul G. Hoffman, vice-president, Studebaker Corp., who sails on the Ile de France, Sept. 29, and Alfred P. Sloan, Jr., president, General Motors Corp., who plans to sail on the Olympic, Sept. 22.

Alderfer Named Chairman

J. M. Alderfer has resigned as president of the India Tire & Rubber Co. and has been named chairman of the board. The directorate has been reduced to seven members. A new president and a new board of directors will be elected at the next stockholders' meeting.

O'Brien Heads Stearns Sales

Ray H. O'Brien has been appointed general sales manager of the Stearns-Knight Sales Corp., builders of the Stearns-Knight cars. Mr. O'Brien succeeds L. E. Corcoran.

Toepel Joins Robert Bosch

M. E. Toepel has joined the engineering staff of the Robert Bosch Co., Long Island City, N. Y. Prior to joining the forces of this company he was electrical engineer for the Mack-International Motor Co.

Hillman to Offer Low-Priced Eight

Car to Compete With American Vehicles to be Shown at Olympia

LONDON, Sept. 8—it was announced here this week in Coventry by the Hillman Motor Co. (now among the six British firms with the largest output), that a new straight-eight to be shown at Olympia will be offered at prices lower than those of any eight-cylinder car, British or foreign, now on the English market. The most expensive sedan, with safety glass, vacuum servo brakes, wire wheels, dipping headlamps, furniture hide upholstery and other special features will be less than £500. The engine, of approximately 2½ litres, is rated at 18 hp., but it is said that in performance the car is at least equal to American productions of appreciably higher ratings, owing to the engine efficiency and high power-to-weight ratio. Several examples have been under test for six months and one returned yesterday from a 3000-mile high-speed and hill-climbing tour in Switzerland and France. Particulars as to design, dimensions, etc., may not be given at present, but it can be said that the range of bodywork will be interchangeable with the Hillman 14, which implies a standard of quality in finish and equipment unsurpassed by any British car in the medium-price field.

Another British Eight of which much more is likely to be heard in future is the 21-hp. Wolseley (2¾ litres), the prices of which have just been reduced by amounts representing from 22 to 26 per cent; the fabric and coach-built sedans, for example, are down to £550 from £750. A larger model is also to be made for 1929, rated at 32 hp. but this will be offered in chassis form only, at £1,075. The prices of other "continued" model Wolseleys have also been reduced very considerably, no doubt owing to the reorganization of the plant that has been in progress since it was acquired by W. R. Morris. The 16 hp. six sedans, for instance, are reduced from £495 to £375.

Record Fourth Quarter Assures Record Year

(Continued from page 386)

expansion of recent years, is on a much improved and continually improved basis.

That the industry is not drifting into the hands of monopolists. We have had mergers and we shall have more of them. But the achievements this year of several of the smaller passenger car makers have served to remind us that the public will not buy all its transportation in one place, and that originality and good management still have plenty of opportunity.

That the competent, resourceful parts maker has a greater opportunity than ever before to prove himself indispensable to the vehicle builder who is forced by competition to employ every possible means of obtaining advanced designs, elastic production and low costs.

Upward of 150 credit executives of parts, accessory and shop equipment companies attended the conference which was sandwiched between regular monthly meetings of eight M. & A.M.A. credit groups held yesterday and called for tomorrow. J. M. McComb, president of the association, presided, and the program was planned by M. L. Heminway, general manager, and A. H. Fagan, manager of the credit department, assisted by a Buffalo committee headed by Edward S. Gram of the Crosby Co.

Jones Dabney Opens Factory in Detroit

LOUISVILLE, KY., Sept. 11—W. C. Dabney, of the Jones Dabney Co., Louisville manufacturer of varnishes and lacquers, has announced establishment of a new branch lacquer manufacturing plant at Detroit, where a specially constructed lacquer plant has been erected and equipped for the purpose of producing lacquers to supply customers among the large automotive concerns.

The Detroit plant will be operated in conjunction with a sales office and a warehouse, which will stock the various lines produced by the main plant at Louisville. Sophus H. Bohme, who has been assistant superintendent in the lacquer division of the company at Louisville, goes to Detroit, as production manager in charge of the new lacquer plant there.

The company is also planning establishment of a new or special color service department, in connection with the Detroit division.

Alexander Mullin

DETROIT, Sept. 8—Alexander Mullin, 57 years old, for many years a production executive of the Buick Motor Co., and more recently associated with the General Motors Export Corp. plant in Australia, died aboard ship in the Pacific Ocean en route home. Mr. Mullin had been ill 10 weeks. Burial will be at Flint.

India Plans Fuel Tax

WASHINGTON, Sept. 13—A tax of four cents per gallon on gasoline produced in or imported into India has been recommended by a committee in a report recently submitted to the Indian Government, the Department of Commerce is informed by the American consular office at Calcutta. Funds from the tax will be devoted to road development.

Financial Notes

C. G. Spring & Bumper Co. has passed the quarterly preferred dividend payable Oct. 1, 1928. Current demand for C. G. bumpers is especially heavy the company reports and in the judgment of the directors the dividend was passed to conserve the company's cash in handling this business. Preferred stock dividends are cumulative and the company reports that an entire year's preferred dividend requirements were earned during the last two months of the fiscal year ended Aug. 31, 1928.

Bendix Corp. has approved a plan for reconstruction of its capital by the issuance of 600,000 shares of $5 par stock, the elimination of 65,000 Class A shares and the issuance of new capital shares to be exchanged for the present outstanding Class B stock of $10 par in the ratio of two new shares for one old. Annual dividends of $2 will be paid on the new shares. The recall of existing Class A shares will utilize 40,000 shares of the new capital stock authorized.

Wisconsin Parts Co. common stock has been listed on the Chicago Stock Exchange and 35,000 shares have been offered at $24. Net earnings of the company in the first six months this year totaled $186,487, equivalent to $2.66 a share on the 70,000 shares soon to be outstanding. This compares with $229,056 in the entire year 1927. The balance sheet as of June 30 shows current assets of $744,003 as compared with current liabilities of $172,702.

Curtiss Aeroplane & Motor Co. stockholders of record Sept. 25 will have the right to subscribe to 58,149 shares of new stock at $100 a share in the ratio of one share to each five shares held. Rights to purchase will expire Oct. 25. Proceeds will be used to expand facilities for manufacturing of airplanes and engines.

Electric Auto Lite Co. has declared regular quarterly dividend of $1 on common and $1.75 on preferred stock, both payable Oct. 1 to holders of record Sept. 20. September business will be 250 per cent larger than in Sept., 1927.

Indian Motocycle Co. reports net profit for the six months ended June 30 as $105,643 after all charges. This is equivalent, after allowing for preferred dividend requirements, to 80 cents a share on common stock.

Raybestos Co. and subsidiaries report earnings of $540,791 after charges, taxes and deductions for preferred dividends, in the first six months this year, comparing with $521,519 in the same period last year.

Timken Detroit Axle Co. has declared regular quarterly dividend of 15 cents and an extra dividend of five cents on common payable Oct. 1 to holders of record Sept. 20.

Auburn Automobile Co. has declared quarterly dividend of $1 on common and a stock dividend of 2 per cent, both payable October 2 to holders of record Sept. 21.

Checker Cab Manufacturing Corp. preferred stock has been converted into common stock, according to an announcement just made.

Department of Commerce Reviews Strides of Automotive Foreign Sales Since 1921

WASHINGTON, Sept. 8—A dramatic and magnetic story of the enormous strides taken in the last six years by the automotive industry, which jumped from the modest position of eleventh among the leaders of foreign trade in 1921-22 to fourth place among exporters of the whole nation in the fiscal year ended June 30, 1928, is contained in statistics, tables and tabulations just issued by the bureau of foreign and domestic commerce of the Department of Commerce in its annual review of the foreign trade of the United States.

Full credit for the part the automotive industry has played in making Uncle Sam one of the world's leading exporters is given by the bureau in its summary as follows:

"A large share of the growth in our exports of finished manufactures during 1927-1928 was due to the increased sales of automobiles and accessories. The number of passenger automobiles, bodies and trucks totaled 423,000 which was 18 per cent more than in 1926-27, and eight times more than in 1921-22. The value of our exports of automotive products which in 1921-22 amounted to less than $81,000,000, in 1927-28 reached $425,000,000. The increased sales of automobiles were accompanied by a further expansion in exports of rubber tires which were about 11 per cent larger in quantity and 7 per cent greater in value than in the preceding year."

The automotive industry was hidden far down the line of exporters in the fiscal year of 1921-22. Only 52,000 vehicles were shipped that year. The total valuation was $80,800,000 of vehicles, parts and accessories. Ahead of automobiles in the leading exports list came raw cotton, petroleum, machinery, wheat, packing-house products, iron and steel mill products, copper, tobacco, cotton manufactures, and coal and coke.

Today the automotive industry as an exporter bows only to King Cotton and two others as leaders in shipments to foreign lands. The year 1927-28 saw $820,500,000 worth of raw cotton, $481,900,000 worth of petroleum and its products, and $464,100,000 worth of all sorts of machinery leave ports of the United States for foreign consumption. Next in the list is automobiles, parts and accessories with $425,100,000.

Itemized figures show that the big jump in exports of automotive products came between the fiscal years of 1921-22 and 1925-26. In 1921-22, exports of automobiles, parts and accessories totaled $80,800,000 and in 1925-26, this figure jumped to $332,000,000. In 1926-27 another gain was recorded, exports that year reaching the total of $359,600,000. Thus the 1927-28 figures show a gain of 18.2 per cent over 1926-27 and 426.1 per cent over 1921-22.

Motor trucks show a phenomenal increase in popularity as exports. In 1921-22 the value of trucks shipped was $6,500,000. In 1925-26 this figure had jumped to $46,500,000; in 1926-27 to $57,400,000 and in 1927-28 to $76,400,000—representing an increase in 1927-28 over 1921-22 of 1070.5 per cent and over 1926-27 of 33.1 per cent. Motorcycles, during the six-year period, passed their zenith as popular exports and started a decline, the figures being: 1921-22, $3,100,000; 1925-26, $5,200,000; 1926-27, $4,500,000, and 1927-28, $4,300,000.

Passenger cars, complete, gained more than 500 per cent during the six-year period, the figures being: 1921-22, $36,100,000; 1925-26, $185,400,000; 1926-27, $200,300,000, and 1927-28, $231,000,000.

A.S.M.E. Aero Division to Discuss Production

NEW YORK, Sept. 10—The aeronautic division of the American Society of Mechanical Engineers will meet in Wichita, Kan., Sept. 21 and 22. The meeting has been so arranged that those returning East from the National Air Races will have an opportunity to take in the meeting. C. L. Henderson, vice-president of the Vickers Petroleum Co. and Mr. Mac Short, vice-president of the Stearman Aircraft Co., are in charge of the arrangements of the meeting.

The program will consist of an engine session Sept. 21, at which two papers will be presented: The Commercial Aircraft Engine of Medium Power, by Richard M. Mock, and the Type Testing of Commercial Airplane Engines of Medium Power, by the Bureau of Standards. In the afternoon a symposium will be held on the Problems of Commercial Plane Production, the authors being Walter H. Reech, Travel Air Mfg. Co.; W. C. Cummings, Mohawk Aircraft Corp; Jerome Lederer, Aerotech, and E. E. Porterfield, Jr., American Eagle Aircraft Corp.

Ford Buys Motometers

NEW YORK, Sept. 8—Moto Meter Co., Inc., has received an order from the airplane division of Ford Motor Co. for 10 Boyce motometers for indicating oil temperatures.

Navy Orders Triple Screens

WASHINGTON, Sept. 8 — Triple screening over carburetor air intakes and other vents in gasoline engines has been ordered by the Navy Department in an effort to cut down the fire hazard from back-firing. The bureau of engineering of the navy after a thorough investigation determined that the flame from a back-fire occurring in a gasoline engine can be propagated through the single screen which has been used for some time on air inlets. The screening recommended by the Navy to prevent back-fire blazes is 40-mesh, brass or bronze wire, 31 B & S gage in diameter, the three screens to be installed at spaces not more than a quarter of an inch apart.

Ford Plans Erection of New British Plant

LONDON, Aug. 29 *(by mail)*—Two developments have just become apparent in regard to the production of Ford cars and trucks in Great Britain. In the first place the large tract of land near the Thames at Dagenham (about 20 miles from London) that was acquired by Ford some three years ago and has since been unoccupied, will shortly be taken into use by the erection of a plant on this 300-acre site. One building, it is said, will cover 30 acres.

The second development is a decision to transfer the most of the existing equipment of the Irish plant at Cork to the main plant at Trafford Park, near Manchester. This is said to be due to the import duty of 22 2/9 per cent which, since last April, has had to be paid upon Irish-made Ford cars and components entering England, which absorbs the bulk of the Cork output. The Cork plant, it is officially stated

Australia Buys Compounds

WASHINGTON, Sept. 8—A good market exists in Australia for sale of valve grinding compounds, the Department of Commerce has learned by cable from Melbourne. Most wholesale accessory houses in Melbourne import the compounds and supply local garages and motor engineers, the water compound being more favored at the present to the grease. The water compound is similar to the grease, containing grease mixed with water. In 1 pound tins and over such compounds are duty free but are taxed as imports in packages under 1 pound. Most compounds come already packed in 7 oz. cans or 4 oz. cans, but the duty does not affect sale of American products owing to the fact that the United States controls the market.

U. S. Cars Gain in Berne

WASHINGTON, Sept. 8—Cable dispatches from Berne, Switzerland, inform the Department of Commerce that automobile imports for the first seven months of 1928 numbered 6035 as compared with 6659 for the corresponding period of 1927, but that the American share of these imports was 3957 in 1928 as compared with 2581 in 1927.

Goodyear Registers in Philippines

NEW YORK, Sept. 8—The Goodyear Rubber Plantation Co. of Akron, has been registered as a corporation in the Philippines with a capitalization of $5,000,000.

Airways Growth Outstrips Railways

Increase to 13,131 Miles in Quarter Century—Eight Companies Prosperous

WASHINGTON, Sept. 8—Twenty-five years ago last Aug. 15, the world gasped as it realized man could fly in a heavier-than-air machine. Last Aug. 15, the same world saw in the United States some 26 companies operating 32 airways over 13,131 miles with planes flying 31,240 miles daily. And, today, with the twenty-fifth anniversary of flying but recently passed, the world thinks nothing of it at all.

Comparing the development of airways with railways, the department remarks that on the twenty-fifth anniversary of the railroad in 1850 there were but 9021 miles of railway in the United States.

The above figures, obtained from the aeronautics branch of the Department of Commerce, may shortly be increased to 15,869 miles, when 2738 miles of airways scheduled to come into active operation actually form a part of the airway chain of the United States. Of this total, the Department of Commerce says, 14,502 miles will be air-mail lines as compared with 11,764 miles of mail lines now operating.

While previous statistics for all airways are not available, the department figures show that from a total of 218 miles in air-mail routes on Dec. 31, 1918, the air-mail increased to 2842 miles on March 31, 1923, and to 11,764 miles on Aug. 15, 1928.

There are now 4898 licensed pilots in the United States, and licensed airplanes number 5816.

From a business viewpoint air lines were profitable to eight out of 21 operators, who had an income of $1,340,333 and expenses of $856,570, profitable companies paying returns of 28 per cent on their investment.

The total value of all air products has increased from $14,372,000 in 1919 to $21,161,853, according to figures of the areonautics branch. In 1927 the United States produced 1995 planes valued at $14,504,999.

To Make Ventilators

PONTIAC, Sept. 10—J. H. Parsons Co., manufacturer of closed car window ventilators, has licensed Ackerman-Blaesser-Fezzey, Inc., Detroit, to manufacture its Zephyr type panels under the Parson patents and to market them under the trade name "Common Sense" ventilators.

Packard N.Y. Sales 8231

NEW YORK, Sept. 8—Packard Motor Car Co. of New York established a new sales record during the fiscal year ended Aug. 31, 1928, with delivery of 8231 new cars. The old record was 6310 deliveries in the year 1926-27.

1233 Airports Now in Operation in U.S.

WASHINGTON, Sept. 8—Municipal airports in the United States on the twenty-fifth anniversary of flight, Aug. 15, 1928, numbered 367, according to a statement by the aeronautic division of the Department of Commerce. Private and commercial airports are not far behind, numbering 331 on that date, while intermediate landing fields maintained by the department numbered 256, it was stated. The Army has 62 airports and the Navy has 17 aviation fields. Proposed airports number 754.

Szekely Company Joins NuPower Piston Ring

GRAND RAPIDS, MICH., Sept. 10—The O. E. Szekely Corp., developer of the "Ramco" inner rings and manufacturer of the "Ramco Sealflex" piston rings, has united with the NuPower Piston Ring Corp. at Holland, Mich. Until recently, the Szekely company was under contract with the Ramsey Accessories Mfg. Corp. At the expiration of the contract, Sept. 1, O. E. Szekely, president, decided to join the recently formed NuPower organization, and make his rings under that name. The rings will be merchandised as the NuPower piston ring and the NuPower inner ring.

Graham-Paige Wood Mill to Prepare Body Timber

DETROIT, Sept. 10—Graham-Paige Bodies Corp., a subsidiary of Graham-Paige Motors Corp., has begun erection of a mill at Perry, Fla., to supply dimension-cut hardwoods to the Graham-Paige body plants. The new mill, costing $150,000, will have 50,000 sq. ft. of floor space, with nine dry kilns 20 x 150 ft. Its production capacity will be 60,000 board feet a day.

By drying and cutting the wood to dimensions before shipping to the body plants, the new mill will effect saving in transportation costs, these operations eliminating 20 per cent of the weight. Perry is a center of hardwood timber operations in Florida. Charles Hastings, of Detroit, is manager.

Italian Plants Active

WASHINGTON, Sept. 12—Cable advices from Rome to the Department of Commerce indicate that Italian automobile production is increasing and recent exports have been very heavy, particularly to the British possessions and Switzerland. Principal producers are reported behind on orders but American sales continue satisfactory, with more potential dealers and agencies available.

Used Car Difficulty Increasing Abroad

Department of Commerce Finds New Zealand Only Active Market Abroad

WASHINGTON, Sept. 8—Merchandising of used cars is becoming a serious problem in many foreign markets, according to the Department of Commerce, New Zealand being the outstanding exception to a situation that is reported becoming general. The department's statement on world-wide conditions follows:

"The used car situation is developing into a serious problem in many foreign markets. In Argentina the demand for used cars is small and dealers are content if they can handle this business without loss. Advices from France show no improvement in a situation which has begun to worry dealers. The used car fair recently held in Paris was not a success, the public showing little interest in the display.

"In Germany and the United Kingdom the used car problem has not attained such serious proportions as in the United States. In the former country the Automobile Manufacturers' Association and the Automobile Dealers' Association have set up a used valuation company which is attempting to fix prices and terms for dealing in used cars. Dealers in the United Kingdom as a rule allow higher prices for trade-in of British used cars than for imported models.

New Zealand is one of the few markets where the used car situation is reported excellent, several firms stating that they are unable to supply the demand. The stock of used cars in this country is at the lowest it has been for two years.

Mexican Sales Increase

WASHINGTON, Sept. 13—Automotive business conditions continue favorable in Mexico, according to information cabled to the Department of Commerce from Mexico City. July registrations showed an increase of 603 cars over the previous month in the federal district, in spite of unsatisfactory business conditions.

Mexican Airmail to Start

WASHINGTON, Sept. 10—Airmail service to Mexico will be started Oct. 1, according to announcement by Postmaster General New. The United States service will connect with the Mexican lines at Laredo, Texas.

Austrian Plants Busy

WASHINGTON, Sept. 8—Demand for automobiles in Austria continues active with Vienna factories fully booked into the autumn, according to cabled advices to the Department of Commerce from Vienna.

Steel Orders Exceed September Capacity

Heavy Billings of Sheets in October at Present Prices Seen Resulting

NEW YORK, Sept. 13—The leading interest's unfilled tonnage statement issued on Monday, showing an increase of 53,116 tons in its backlog as of Aug. 31, failed to give comfort either to the extremists who delight in picturing the steel demand as heavier than it is, or to those who for some time have been carrying on a whispering campaign to the effect that "things are not anywhere as rosy as the steel manufacturers would make them appear to be."

The figures adequately reflect prevailing conditions in the steel industry. The corporation finds itself with a greater volume of unfilled business on hand than it has had at the beginning of September in any year since 1923, and this is quite likely true of the industry as a whole. On the other hand, the character of much of the business now on steel producers' order books differs from that to which the market has become accustomed in recent years.

Talk of higher fourth-quarter prices has unquestionably resulted in smoking out much business that normally would not have been placed until later in the year and a dip in fourth-quarter buying may equalize or show up as having been merely temporary, the gain during the current quarter.

Mills have booked considerably more business than they can ship during the remainder of this month, and it is understood that this will necessitate heavy billings of sheets at third-quarter prices in October. This, in itself, will tend to operate against higher prices becoming fully effective with the quarter's turn. Specifications on sheet contracts by automotive consumers are running heavy. Many buyers are far more concerned about getting all steel due them in hand before the two per cent cash discount is lowered on Sept. 30 than about the fourth quarter advances.

Fender strip stock has been advanced $3 a ton to 4.25 cents for No. 20 gage, and higher prices for both hot and cold-rolled strip-steel generally are named, but producers are in a conciliatory mood, with the result that they have booked a heavy volume of business at old prices and future business will likely be placed on a compromise basis. Some Middle West rollers have named a $33 price for sheet, bars, as well as billets for fourth quarter.

Pig Iron—The buying movement which has resulted in advances all along the line seems to be slowing down. The price for No. 2 foundry iron appears to have been definitely established at $17, Valley.

Aluminum—The market is devoid of new features, a fair volume of business passing at unchanged price levels.

Copper—Demand for copper has been so heavy in the last few weeks that consumers are prepared for an early advance in producers' prices. A very conservative policy is being pursued by producers.

Tin—The principal holder of spot Straits tin appeared as a seller of futures at prices below those in vogue in London, and as a result prices gave way to the extent of ½ cent. Quite a little tin has been bought by consumers.

Lead—Most of the producers have sold more lead than they will refine this month and are not very eager for additional business at prevailing prices. The market is strong, but slightly less active.

Zinc—More strenuous efforts to bring about curtailment of ore output are being made. The market for the metal is quiet and unchanged.

Texas Fuel Pumps Short 18,532,000 Gal.

AUSTIN, TEXAS, Sept. 10—An investigation of gasoline pumps in different cities and towns of the state has just been made by B. A. Stovall, supervisor of weights and measures in the state department of agriculture. In a report he said that of the 374 gasoline pumps which he tested, 304 gave short measure. On the basis of the results he obtained in these tests, he estimated that the total gasoline shortage which the motorists paid for during the twelve-month period was 18,532,000 gal.

"Fifty of the 374 pumps tested gave a little more than was bought, while only 20 out of the total accurate," Mr. Stovall said.

Stock of Crude Rubber in U. S. Drops in July

WASHINGTON, Sept. 13—Crude rubber reexported from the United States during July amounted to 3087 long tons valued at $1,451,446, according to the Department of Commerce. Gross imports of crude rubber, liquid latex and guayule, during July, amounted to 31,449 long tons; deducting reexports, the net imports amounted to 28,362 long tons.

United States stocks of rubber in June amounted to 90,198 tons and in July dropped to 83,242 tons, the lowest figure for any month in 1928. World stocks of rubber at the end of June totaled 212,626 long tons. At the end of June, 1927, world stocks amounted to 247,554 tons.

No Dutch Rubber Restriction

WASHINGTON, Sept. 13—No restriction of the production of rubber and no attempts to reach agreements with American consumers will be made by Dutch rubber producers at the present time, the Department of Commerce is informed by radio from J. F. VanWickel, commercial attache at The Hague.

July Exports Rise 45% Over July '27

Passenger Car and Truck Shipments Total 51,670—Argentine Best Market

WASHINGTON, Sept. 13—Keeping step with the high July production of automotive products this year, shipments of such products to foreign countries during July were valued at $46,526,449. This was an increase of $677,674 or 1.5 per cent over June exports and 45 per cent higher than July, 1927, when the total exports amounted to $31,950,356, the Department of Commerce announces.

The 1928 monthly average of exports of automotive products including July rose to $43,780,161, as compared with a monthly average of $36,244,444 in the first seven months of 1927.

Total number of passenger car and truck units shipped during July amounted to 51,670, a gain of 4499 in number or 10.9 per cent over June and 23,066 or 80.6 over July, 1927. Exports of passenger cars only amounted to 38,880 units, 7.9 per cent over the June total and double the figure of the same month of 1927. Average value of passenger cars shipped amounted to $608 as compared with $680 in June, because of increased shipments of cars in the low price range.

Best markets in July in the passenger car field were, according to importance, Argentina, Australia, Brazil and Canada. The best markets for trucks were Argentina, Brazil and Australia. Average truck valuation in July shipments was $635 as compared with $669 in June.

Mid-West Sales Increase 50 Per Cent Over July '27

CHICAGO, Sept. 10—The Chicago Federal Reserve Bank reports retail sales of new cars in July in the Middle West district increased 11.1 per cent over June and 49.9 per cent over July last year. Stocks of new cars on hand at the close of July were 28.3 per cent lower than a month earlier but 2.4 per cent higher than a year earlier.

Used car sales in July were 7.9 per cent under June but 20 per cent higher than in July, 1927. Used cars on hand at the close of the month were 2.4 per cent lower than a month earlier but 2.7 per cent higher than a year earlier.

Formed French Hudson Company

PARIS, Sept. 8—Hudson-Essex is now represented on the French market by a company just formed with the title Societe Francaise des Automobiles Hudson-Essex, having a capital of 1,300,000 francs and registered offices at 30 Rue de Tilsitt, Paris. The board of directors is composed of C. A. Oblin, J. M. P. Noel, Georges Chabrier, J. A. Lamy and Paul J. Munch.

Speedy Adoption of Traffic Code Sought

Attempt Will be Made to Obtain General Acceptance in Six Months

NEW YORK, Sept. 11—Organizations which cooperated with the United States Department of Commerce in the promulgation of the suggested uniform highway traffic code have agreed to underwrite the expenses of the work necessary to secure the interest of municipalities in their adoption of this code to the extent of between $20,000 and $24,000.

It is the plan of those in charge of this work to secure the adoption of this code in all cities of 10,000 population or more within the next six months. It is pointed out that 40 state legislatures will meet during the coming winter and it is expected that these legislatures will pass enabling acts wherever necessary so that the municipalities within their borders can adopt a code similar to the suggested standard.

It is believed that California, Minnesota and Michigan, which now have statewide uniform codes controlling the communities within them, will make the necessary changes to conform with the standard.

A committee has been appointed in Chicago to study the local code as compared with the suggested standard and recommend such changes as are necessary.

The steering committee appointed by the conference which adopted the code will have a meeting the latter part of this month to lay out a definite plan of procedure.

Gear Papers Scheduled

NEW YORK, Sept. 12—Among the papers scheduled for presentation at the semi-annual meeting of the American Gear Manufacturers Association in Buffalo, Oct. 11 to 13, is one on the Nitration of Steel by W. H. Phillips of the Molybdenum Co. of America and another on Predetermining Gear Tooth Quality by Russell M. Coldwell of the Fellows Gear Shaper Co.

Dirigible Awards Sept. 17

WASHINGTON, Sept. 8—The names of eight companies submitting bids for construction of the two dirigibles for the U. S. Navy were made public this week by the Navy department. Five of the bids were by American companies and three by German. The highest rating goes to the Goodyear-Zeppelin Corp. which submitted three sets of specifications. The award will be announced Sept. 17.

Canada to Buy Tractors

WASHINGTON, Sept. 13—Virtually all of the 60,000 tractors in actual use in the prairie provinces of Canada, including Manitoba, Saskatchewan and Alberta, are of American manufacture, according to advices to the Department of Commerce from Trade Commissioner Richards at Winnipeg. During the present year, Mr. Richards predicts, probably 12,000 additional tractors will be sold in this area.

Belt Conveyor Type of Parking Garage to be Incorporated in Chicago Building

CHICAGO, Sept. 10—Tests of a newly devised skyscraper garage, automatically operated, have been completed successfully, and such a garage, 25 stories high, will be built in the Chicago Tower, a 75-story structure to be erected on Wacker Drive, just east of Michigan Ave., and to represent a total investment of $45,000,000.

Announcement of the plan for the new skyscraper garage, which is the invention of B. B. Balkema, of Detroit, is made by Walter W. Ahlschlager, architect, who drew the plans for the Tower Building. The garage is designed specifically for the parking of automobiles in congested districts where building height is available but large floor area is not.

Plans for the garage in the Chicago Tower call for a series of 20 hatchways, extending 25 stories upwards. Each hatchway will be formed between concrete walls. In these hatchways steel cages, each capable of holding the largest standard automobile, will be placed on top of each other, between steel guides.

Movement of the cages will be on the same principle as a belt conveyor. The tiers of steel cages in each pair of adjacent hatchways will operate simultaneously. The rotation of the cages will be controlled by means of hydraulic mechanism. When one tier is raised the adjacent tier will be lowered.

As a cage reaches the top of the hatchway of the tier which is being lifted, it will shunt automatically and horizontally into the adjacent tier. At the same time, the cage at the bottom of the lowering tier will shunt into the tier which is being raised. The two adjacent tiers, containing some cages which are empty and some with automobiles, automatically rotate to a point where the load of both tiers balances evenly on the machinery in the basement.

No manual labor of any kind above the first floor is necessary or possible in this skyscraper garage. Operation of the tiers of cages up and down is controlled by a key, held by the owner of the parked car. When the key is inserted in the proper switch the series of cages begins to rotate until the cage corresponding with the key reaches the ground floor. The doors then open automatically and the car may be driven out.

The hydraulic lifting apparatus will have a thrust of eight feet in six seconds. An automobile in a cage at the top of the 25-story garage can be brought to the ground floor in 216 seconds.

Each of the 20 hatchways will have a separate entrance lane on the basement floor, making it possible to load and unload 20 automobiles simultaneously. The 20 tiers of cages will have a capacity of 1080 cars. Since there are no floors or ramps all space is completely utilized.

Fireproof construction of the garage, with doors only at the top and bottom of each hatchway, means a consequent low rate of insurance. Low installation and maintenance costs will make it possible to operate the garage at a moderate rate to the automobile owner, it is said.

The garage in the Chicago Tower will be the first of a series of skyscrapers which are planned for cities throughout the country where congestion makes parking difficult in business districts.

Wire Wheel Adds Equipment

BUFFALO, Sept. 10—Wire Wheel Corp. has completed installation of new and improved equipment which will provide for increased production. The company has renewed its contract with Stutz Motor Car Co. of America, Inc. Several departments are working two shifts.

Grahams Build Power Plant

EVANSVILLE, IND., Sept. 10—Construction of a modern power unit to cost $200,000 has been begun at the new factory of the Graham-Paige Body Corp. The power unit will supplement the 10½ plant units which with machinery will cost $1,100,000.

Detroit Plane Company to Instruct in Flying

DETROIT, Sept. 10—Wings, Inc., has been formed in Detroit to provide one of the most complete training courses in the field of commercial aviation. The company will also act as distributor for Fairchild and Curtiss-Robin cabin monoplanes, and as factory agent for all kinds of aerial supplies and parts, besides conducting a service for privately owned airplanes and aircraft generally.

Officers of the firm are Harry R. Graham, president; Stanley Knauss, general manager of Stout Air Services, vice-president, and C. V. Burnett, secretary and treasurer. Directors include Charles T. Bush, Carl H. Keller, Frank W. Blair, Bruce H. Wark, Edwin E. Kramp, Harold M. Hastings, Fred W. Warner, E. S. Evans, E. J. Lantz, William E. Metzger, J. S. Morriss, L. C. Tuttle, Hubert E. Hartman, C. W. Carter, T. L. Whitford Porte, William B. Stout and George M. Holley.

Bad Weather Slows Hardwood Output

ATLANTA, Sept. 12—Automobile factories continue the heaviest buyer of Southern hardwoods. Buying, however, is for current or near future wants only, with sales largely confined to factories in the Middle West. A few orders for last quarter needs are reported but nothing beyond this though the inquiry is excellent and promises a heavier volume of buying the last part of the year.

Judging from inquiries automobile factories are planning rather heavy production schedules. Body plants in the Middle West are buying on about a normal basis, orders from Eastern plants only a little below normal, while body plants in the Southeast are buying on a better than normal basis, and placing a number of sizeable orders for advance needs.

Primary call from the automotive industry is for thicker dimensions of ash, maple and elm, with a heavy call reported for sap gum. There is no surplus of any of these items at mills in the Southeast, due to bad weather the past several weeks retarding production, and dry lumber is next to impossible to obtain if quick delivery is wanted. As a whole prices are steadily on an upward trend, with current quotations for automobile lumber several dollars higher than they were five or six weeks ago.

C. I. T. Extends Interests

NEW YORK, Sept. 10—Commercial Investment Trust Co. has closed a contract to acquire the capital stock of Peierls, Buhler & Co., Inc., which has specialized in financing in the textile field.

Coming Feature Issues of Chilton Class Journal Publications

Oct. 10—Marketing Annual for 1929—Motor World Wholesale.

Nov. 17—Production and Factory Equipment Issue—Automotive Industries.

August Airmail Doubles Following Rate Reduction

WASHINGTON, Sept. 13—Almost simultaneously with the reduction of airmail postage rates in the United States from 10 cents to 5 cents per half ounce on Aug. 1, the poundage handled increased 95 per cent, the Postoffice Department announces. The great bulk of the mail is carried between San Francisco and New York City.

Postmaster General New announced that most sanguine expectations of postal officials were exceeded in the amount of air mail handled during August under the new five-cent rate, when the total of 418,821 lb. were transported by air as compared with 214,654 lb. in July under the old 10-cent rate. Leading routes are Chicago-San Francisco; New York-Chicago and Salt Lake-Los Angeles.

Postal Receipts Drop

WASHINGTON, Sept. 13—Indicating a slight let-up in business which uses the mails, the total postal receipts at 50 selected cities in the United States decreased more than $500,000 during August as compared with the same month of 1927. Receipts during August were $27,951,450.

Three States Show Highway Extensions

WASHINGTON, Sept. 8—Evidence of the enthusiasm with which the South is expanding its highway systems is found in fiscal reports for the states of Georgia and Florida just compiled and made public by the Department of Commerce. In Georgia during 1927, $12,772,806 was laid out for construction of highways and $2,365,501 for maintenance of highways, a total of $15,138,307. The sales tax on gasoline in 1927 brought in $5,733,045 to the state, an increase of 47 per cent over the $3,895,444 for 1926.

In Florida an even greater sum was spent building highways in 1927, the total of $19,555,951 being charged up to highway construction work and $2,696,272 to highway maintenance. Gasoline sales taxes brought the state a total of $8,816,791 in 1927, an increase of 16.5 per cent over the figure of $7,539,236 in 1926.

Figures for Connecticut also were made public, showing an expenditure by that state of $11,891,370 on the highways of the state, $4,101,020 being for maintenance and $7,790,350 for construction. Gasoline tax collections showed increases.

Fairchild Stages Fly-Away

NEW YORK, Sept. 11—Nine Fairchild cabin monoplanes left the factory at Farmingdale, L. I., during the past week in an airplane "fly-away." Three of these planes were delivered to the Canadian Colonial Airways for use on the New York-Montreal air line, one was delivered in Chicago, one to the Albany Air Service of Albany, N. Y., two to the Campana Mexicana de Avincion.

Calendar of Coming Events

SHOWS

Aeronautical Exposition, Coliseum, Chicago .....Dec. 1-9
American Electric Railway Ass'n, Public Auditorium, Cleveland..Sept. 22-28
American Road Builders Association, Inc., Cleveland Auditorium..Jan. 14-18
American Society for Steel Treating, Commercial Museum, Philadelphia .....Oct. 8-12
American Welding Society, Commercial Museum, Philadelphia .....Oct. 8-12
Automotive Equipment Association, Coliseum, Chicago .....Oct. 22-27
Berlin .....Nov. 8-18
Boston, Mass., Mechanics Bldg...March 2-9
Brussels .....Dec. 8-19
Buenos Aires .....Nov. 29-Dec. 9
*Chicago, National, Coliseum, Jan. 26-Feb. 2
International Aviation Exposition, Berlin .....Oct. 8-28
London, passenger cars .....Oct. 11-20
Montevideo .....Nov. 10-19
National Standard Parts Association, Cleveland Auditorium...Oct. 29-Nov. 3
*New York, National, Grand Central Palace .....Jan. 5-12
Paris, passenger cars .....Oct. 4-14
Paris, trucks .....Nov. 15-25
Salon, Automobile Salon, Inc., Hotel Drake, Chicago .....Jan. 26-Feb. 2
Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles .....Feb. 9-16
Salon, Los Angeles Motor Car Dealers Association, Biltmore Hotel..Oct. 17-20
Salon, Automobile Salon, Inc., Hotel Commodore, New York .....Dec. 2-8
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco...Feb. 23-Mar. 2
Western States Metal and Machinery Exposition, Los Angeles.....Jan. 14-18

* Will have special shop equipment exhibit.

CONVENTIONS

American Electric Railway Ass'n, Public Auditorium, Cleveland...Sept. 22-28
American Gear Manufacturers Ass'n, Statler Hotel, Buffalo, N. Y...Oct. 11-13
American Institute of Mining and Metallurgical Engineering, Metals Division, Benjamin Franklin, Philadelphia .....Oct. 8-12
American Road Builders Ass'n, Inc., Cleveland Auditorium .....Jan. 14-18
American Society for Steel Treating, Commercial Museum, Philadelphia .....Oct. 8-12
American Society for Steel Treating, Semi-Annual Meeting, Los Angeles .....Jan. 14-18
American Welding Society, Commercial Museum, Philadelphia .....Oct. 8-12
Automotive Equipment Association, Coliseum, Chicago .....Oct. 22-27
International Air Conference, Washington .....Dec. 12-14
Machine Tool Congress, joint meeting with Machine Shop Practice Division, American Society of Mechanical Engineers, Cincinnati...Sept. 24-27
Mid-West Motor Truck Transportation Congress, Indianapolis..Oct. 23-26
National Battery Manufacturers' Association, Ambassador Hotel, Atlantic City .....Sept. 20-21
National Highway Congress, Mexico City .....Oct. 3-6
National Metal Congress, Los Angeles .....Jan. 14-18
National Research Council, Washington .....Dec. 13-14
National Safety Council, National Congress, New York .....Oct. 1-5
National Standard Parts Association, Hollenden Hotel, Cleveland, Oct. 29-Nov. 3
Society of Industrial Engineers, Rochester, N. Y.....Oct. 17-19
World Motor Transport Congress, Rome .....Sept. 25-29

A. S. M. E.

Cincinnati, Oct. 22-25—Machine Shop Practice.
Cleveland, Sept. 17-20—Fuels.

S. A. E.

National

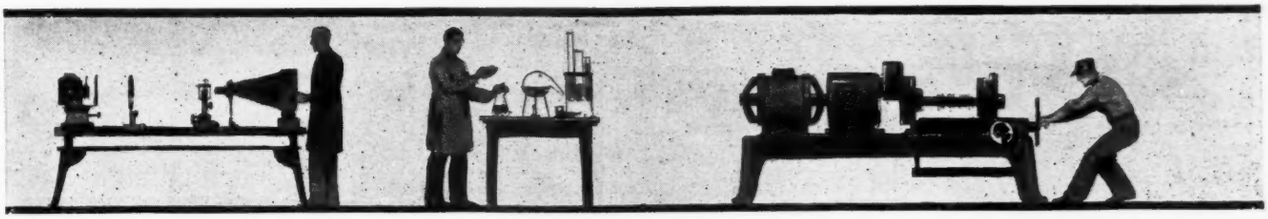
Chicago, Dec. 6-7—Aeronautic.
Detroit, Book-Cadillac, Nov. 22-23—Production.
Detroit, Book-Cadillac, Jan. 15-18—Annual.
Newark, Robert Treat Hotel, Oct. 17-19—Transportation.
New York, Hotel Astor, Jan 10—Annual Dinner.

Sectional

Cleveland, Sept. 29—Outing.

RACES

Great Britain .....Sept. 22
Salem .....Oct. 12



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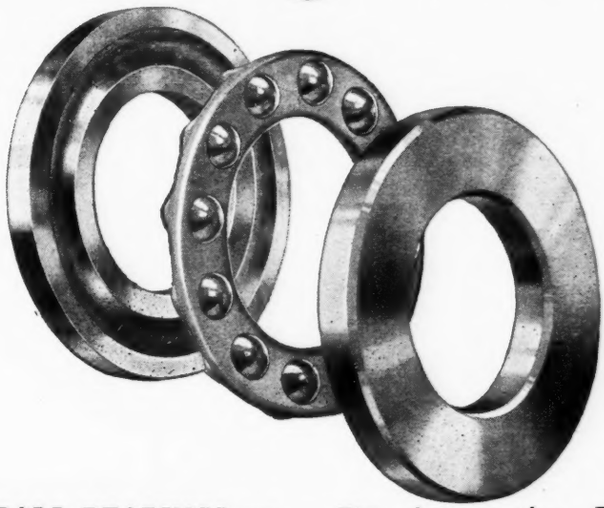

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The AUTOMOBILE

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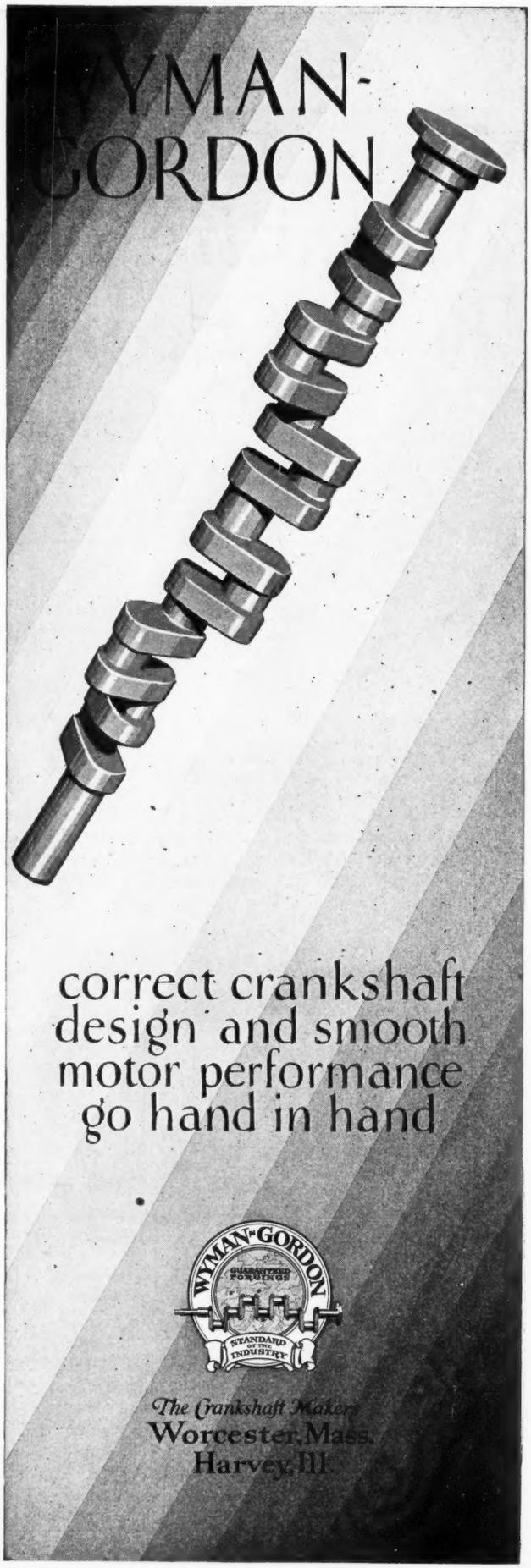
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